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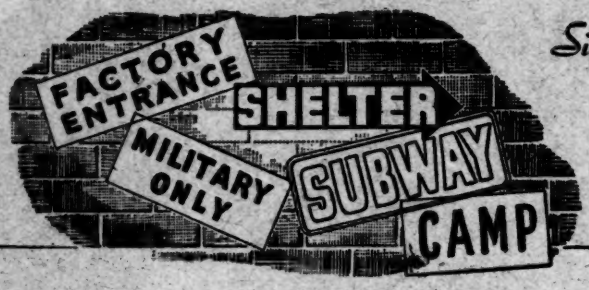

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY NOVEMBER 22 1941

COMBINED ACTIVE AND PASSIVE IMMUNIZATION AGAINST DIPHTHERIA

I. STUDIES OF ANTITOXIN RESPONSE IN NORMAL STUDENTS

BY

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Though in veterinary medicine the prophylactic treatment by combined active and passive immunization of animals has been in vogue since the beginning of the century, it is only within recent years that the method has been applied to the prevention of human disease. The reason for this is not far to seek. In the treatment of animals risks can be taken that are seldom justifiable with man. In such diseases as anthrax, swine fever, swine erysipelas, rinderpest, and African horse-sickness the vaccinating agent used is the living organism. When given along with a suitable dose of protective serum it leads to the more or less permanent protection of the animal after the initial temporary protection by the injected serum has worn off. The essence of the method consists in stimulating an active, under cover of a passive, immunity. In human medicine there are few infective diseases in which a powerful antiserum is available, and in the two outstanding examples, diphtheria and tetanus, no one has dared to attempt active immunization by injection of the living organisms. It was not, therefore, till a safe non-living and non-toxic vaccinating agent was made available by the discovery of formol toxoid (Glenny and Südmersen, 1921 ; Glenny and Hopkins, 1923 ; Ramon, 1923, 1928) that the possibility of combining active and passive immunization in the prophylactic or therapeutic treatment of these two diseases became practicable.

Review of Previous Work

Ramon and Laffaille (1925) studied the production of tetanus antitoxin in guinea-pigs. The animals were divided into four lots. Lot A received 1 c.cm. of anatoxin (formol toxoid) alone. Lot B received 1 c.cm. of anatoxin *mixed with* antitetanic serum containing 4,500 antitoxin units (A.U.). Lot C received 1 c.cm. of anatoxin and 4,500 A.U. of serum given simultaneously *into different sites*. Lot D received 4,500 A.U. of serum alone. Sixteen days later some of the animals in each lot were tested for their resistance to the injection of tetanus toxin. Lot A was found to withstand about 60 m.l.d., whereas none of the other lots withstood even 2 m.l.d. The conclusion was therefore drawn that the serum had interfered with the immunizing action of the anatoxin.

To see, however, whether it had also affected the sensitizing action of the anatoxin, the remaining animals in each lot were given 1 c.cm. of anatoxin 20 days after the first injection. Seven days later they were tested for their resistance to tetanus toxin. The animals of Lot A withstood several hundred m.l.d. The animals of Lot C withstood 10 to 50 m.l.d. The animals of Lots B and D proved almost as susceptible as non-immunized controls. This experiment showed that the simultaneous administration of serum to the animals of Lot C, though it had prevented their immediate antitoxin response, had not entirely destroyed the sensitizing effect of the anatoxin and the consequent ability of the animals to respond more rapidly to a second dose. It also showed that the over-neutralized mixture given to the animals of Lot B was valueless in this respect. Not only did it fail to give rise to antitoxin production, but it likewise failed to sensitize the tissues and enable them to respond to a fresh injection of anatoxin. These experiments were repeated on rabbits with substantially the same results.

In 1928 Ramon described the general properties of anatoxin. Discussing combined active and passive immunization, he considered that the method should not be used except in cases of necessity, since it is less successful in producing active immunity than vaccination with anatoxin alone.

This conclusion was supported by observations on a small number of children described by Martin, Loiseau, and Laffaille (1928). In a school where diphtheria had broken out these workers inoculated 9 children with 0.5 c.cm. of anatoxin and 14 children with the same dose of anatoxin followed half an hour later by 1,000 units of diphtheria antitoxin. All received a second dose of 1 c.cm. of anatoxin 30 days later, and a third dose of 1 c.cm. after another fortnight. Three weeks after the last injection the children were Schick-tested. All the 9 children who were given anatoxin alone reacted negatively, whereas 2 of the 14 children who were given serum as well as anatoxin were Schick-positive.

In 1938 Ramon and his colleagues returned to the subject. Working this time with rabbits, they found that animals given 4 c.cm. of tetanus anatoxin and bled a fortnight later had an antitoxin titre of about 1/5 A.U. per c.cm., whereas those injected simultaneously but into different sites with 4 c.cm. of anatoxin and with serum containing 300 A.U. had a titre of less than 1/600 A.U. After a second dose of anatoxin, however, the titre of the first group was between 2 and 7.5 A.U., and of the second group between 7 and 8 A.U.

In another experiment animals receiving anatoxin alone had a titre 18 days later of 1 A.U. per c.cm., whereas those given both anatoxin and serum had a titre of less than 1/300 A.U. ; but 14 days after a second injection of anatoxin the animals of both groups had a titre of about 7 A.U. It appears from these experiments, therefore, that serum delays or interferes with the primary response to anatoxin, but does not destroy the sensitizing power of the anatoxin and the consequent ability of the animal to respond rapidly to a second dose. This conclusion, however, was not drawn by Ramon and his colleagues.

In a later paper Ramon, Richou, and Maccolini (1939) made similar experiments on rabbits using diphtheria anatoxin and serum. Each lot contained 6 animals. Lot A received 3 inoculations, at five-day intervals, of 0.5, 1, and 2 c.cm. respectively of anatoxin. Lot B received in different sites on the same day 0.5 c.cm. of anatoxin and serum containing 3,250 A.U., followed at five-day intervals by injections of 1 and 2 c.cm. of anatoxin only. Lot C received both anatoxin and serum at each of the three injections, the anatoxin doses being the same as before, and the serum doses being each 325 A.U. The animals were bled 1, 4, 6, 8, and 12 weeks after injection, and then at intervals up to 15 months. The sera of the animals in each lot were pooled and titrated for antitoxin. In all three groups the maximum titre of 3 to 4 units was recorded after a week ; it then fell gradually till after 15 months it was 1/20 to 1/10 A.U. per c.cm. It was therefore concluded that the

simultaneous inoculation of serum does not interfere at all with the development of active immunity following the administration of anatoxin.

This conclusion, which is very much less cautious than that reached in 1925, is seriously open to question. The number of animals used in Ramon's last experiment was small, and the administration of a very large dose of serum to the animals of Lot B and of three successive doses of serum to the animals of Lot C makes it difficult to interpret the antitoxin titres during the first few weeks following the injections. It is conceivable that the serum may have interfered with the active immunity response in the early stages, but that this interference was masked by the presence of circulating antitoxin remaining from the serum injections.

Other papers have been published by Ramon (1938, 1940), based partly on observations made on actual cases of diphtheria treated by the combined method, which have led him to conclude that serum therapy does not interfere at all with the development of active immunity. Since in patients suffering from diphtheria the issue is apt to be confused by the presence of toxin formed by the infecting bacilli themselves, it is hardly worth while abstracting these papers or those of his colleagues on the same lines.

Reviewing Ramon's work as a whole, it will be seen that his earlier experiments were better designed than his later ones to decide whether the administration of serum along with anatoxin interferes with the antibody response of the tissues. It is therefore understandable, though regrettable, that Ramon passed between 1925 and 1940 from an attitude of caution to one of dogmatic assertion.

The experience of other workers on combined active and passive immunization is conflicting. Glenny, Buttle, and Stevens (1931) found that if toxoid was inoculated subcutaneously into guinea-pigs most of the animals had a serum antitoxin content of between 1/100 and 1 A.U. per c.cm. 4 to 6 weeks later. But if antitoxin was given intravenously in an amount sufficient to neutralize all the toxoid injected, either at the time of inoculation of the toxoid or up to 3 days later, no antitoxin was formed. The longer the interval between the inoculation of toxoid and the inoculation of serum, the less was the degree of inhibition of antitoxin production. Even with a 21-day interval, however, antitoxin production was still not as good as in the controls that were given no antitoxin. It thus appears that neutralization of toxoid by antitoxin diminishes the antitoxin response, and that if combined active and passive immunization is to be successful an excess of toxoid must be present in the tissues.

Frey and Schmid (1939) injected 20 children with 1 c.cm. of alum-precipitated toxoid (A.P.T.) subcutaneously and 1,000 to 2,000 units of diphtheria antitoxin intramuscularly. The children were bled at intervals and the antitoxin content of their serum was titrated. All of them showed a fall in the initial value after injection, and none showed any development of fresh antitoxin. Most of the observations, however, were made within 4 weeks of the injection, and no second dose of A.P.T. was given. Since it is well known from the observations of Glenny and Südmersen (1921) and Glenny (1925, 1931) that the main rise in antitoxin does not occur till after the secondary stimulus has been given, the results obtained by Frey and Schmid are not surprising. Indeed, they would hardly be worth noticing were it not for the fact that they were made the basis of an editorial in the *Journal of the American Medical Association* (1939, **113**, 1884), in which the following conclusion drawn from the work of Frey and Schmid and of Paschlau (see later) was emphasized: "Combined active-passive immunization is not feasible in human medicine, the two types of immunization being incompatible with each other."

Much the same criticism applies to the observations, in Mexico, of Leon, Escarza, and Navarro (1939), who gave a single dose of 1 to 1.5 c.cm. of A.P.T. and 1,000 to 1,500 units of diphtheria antitoxin to 80 Schick-positive reactors. One month later, of 42 who were retested 6 were still Schick-positive. Two months later, of 38 who were retested 9 were Schick-positive. As in Frey and Schmid's work, only one dose of A.P.T. was given, and no comparison was made with a group of persons immunized by the active method alone.

Gundel and König (1938) made some very interesting observations on guinea-pigs. They injected them with various formolized and alum-precipitated toxoids or with toxoid-antitoxin floccules (T.A.F.), together with a dose of anti-diphtheria serum, and tested their immunity at intervals to infection with living diphtheria bacilli of the gravis and mitis types. In brief they found that (*a*) animals given serum alone—500 A.U. —were protected for less than a fortnight; (*b*) formol toxoids or T.A.F. alone produced partial or complete immunity within a fortnight; (*c*) A.P.T. produced within a fortnight an immunity that was more complete and lasted longer than that obtained by injection of formol toxoids or T.A.F.; (*d*) the combination of formol toxoid and serum protected guinea-pigs for a week, but left them susceptible again within a fortnight; (*e*) the combination of A.P.T. and serum protected them for a week, left them susceptible during the 2-4-weeks stage, and then protected them again later. In other words, the passive immunity conferred by the serum wore off in a week or two and left the animals susceptible until active immunity resulting from the A.P.T. began to develop 4 to 6 weeks after injection. It is clear from Gundel and König's work that serum does interfere with the response of the body to an active immunizing agent. Unfortunately these workers did not give a second injection of toxoid. They concluded, however, that if combined active and passive immunization is to be satisfactory a dose of A.P.T. must be given which is sufficiently large to leave enough unneutralized toxoid at the injection site to stimulate the development of antibody after the serum has disappeared from the circulation.

Whether this conclusion is correct or not it is difficult to say, but, provided two injections of toxoid are given, neither of the doses need be very large. Gierthmühlen and Voges (1939), for example, in a nursery home where diphtheria had broken out, inoculated children with 0.3 c.cm. of A.P.T. along with 1,000 units of antitoxin. Three weeks later they gave a second dose of A.P.T. of the same amount. All children were Schick-tested six months later, and all were Schick-negative. It is interesting to note that 3 out of 19 children who had received only their first dose of A.P.T. developed diphtheria, and that of 43 who had received both first and second doses of A.P.T. two developed diphtheria within 21 to 46 days after the first inoculation. The disease, however, was of an extremely mild type. These observations support those made by Gundel and König in showing that there is probably a period of relative susceptibility between the time when the passive immunity due to the serum has worn off and the time when the active immunity due to the A.P.T. has developed. They do show, however, in addition, that, provided a second dose of A.P.T. is given, satisfactory immunity is produced at any rate within six months.

The observations of Paschlau (1939) do not bear out Gundel and König's results. Paschlau found that of 39 children with an initial titre of less than 0.005 A.U. per c.cm. who were given a single dose of 0.2, 0.5, or 1 c.cm. of A.P.T., 20 formed no antitoxin within 6 weeks, 11 reached a titre of about 0.03 A.U., and 8 reached a titre of between 0.5 and 20 A.U. When, in another series of 22 children, he gave one dose of 0.2, 0.5, or 1 c.cm. of A.P.T. along with 1,000 units of antidiphtheria serum, 21 completely failed to respond. Paschlau therefore concludes that in children with no initial antitoxin in their blood the administration of serum hinders the response to A.P.T. In children who had already been exposed to diphtheria and whose blood contained some antitoxin, the administration of serum had no inhibiting effect. On the other hand, from the point of view of treatment, it had no advantage, since these children responded very rapidly to an injection of A.P.T. alone.

Fjord-Nielsen (1940) made some interesting observations, complementary to those of Glenny, Buttle, and Stevens (1931), on the effect of serum in delaying antitoxin formation. Working with guinea-pigs, she found that when A.P.T. and serum were given simultaneously no antitoxin was formed within 4 weeks, though the animals became sensitized and responded more readily to a second dose of A.P.T. If the first dose of A.P.T. was given 3 days after the serum, and a second dose of A.P.T. 4 weeks later, the antitoxin titre of the guinea-pigs' serum was higher than when the A.P.T. and serum were injected simultaneously. If the interval between the serum and the first dose of A.P.T. was lengthened to 7 days, then the final titre was higher still. If it was lengthened to 14 days a result was obtained that was as good as if no serum at all had been given. From these experiments it would appear that the administration of serum interferes with antitoxin production but does not destroy, though it may weaken, the sensitizing effect of the first dose of A.P.T.

It is not surprising that the results of different workers whose experiments varied in so many important particulars should have been conflicting and at times apparently contradictory. Looking at them, however, as a whole it is difficult to avoid the conclusion that the simultaneous administration of serum with toxoid interferes with the primary response of the tissues, but does not destroy, though it may weaken, the sensitizing power of the toxoid

which enables the tissues to respond to a second dose of toxoid by the rapid production of antitoxin. This is essentially the same conclusion as was reached, but subsequently abandoned, by Ramon and his colleagues.

Description of Experimental Observations

In view of the findings of previous workers it seemed important to choose (1) a dose of toxoid that was small enough to reveal any possible inhibitory action of the serum; (2) a dose of serum that was not so large as to conceal the active formation of antitoxin in the body as the result of the injection of toxoid; and (3) a toxoid in the form of the alum precipitate to ensure as little interference as possible by the action of the serum. The general plan of the experiments was therefore as follows.

Observations were made at Oxford, Cambridge, and Sheffield on third-year medical students, the majority of whom were between 20 and 22 years of age. In addition a small number of observations were made at Turner's Court Training Colony, near Oxford, on boys all but two of whom were between 14 and 19 years of age.

The subjects were first of all Schick-tested. About 6 to 8 c.cm. of blood was withdrawn from those giving a positive reaction, and sent to Mr. Glenny at the Wellcome Physiological Research Laboratories to be titrated for diphtheria antitoxin. The Schick-positive reactors were then divided into two groups, A and A+P. The subjects in Group A (active immunization) received 0.1 c.cm. (5 Lf) of Burroughs Wellcome's alum-precipitated toxoid (A.P.T.) into the left upper arm. Those in Group A+P (active plus passive immunization) received 0.1 c.cm. of A.P.T. into the left upper arm and 350 to 500 units of Burroughs Wellcome's refined diphtheria antitoxin (Pope, 1938, 1939) into the right upper arm. All injections were made into the deep subcutaneous tissue. Four weeks later the subjects were again bled, and were then given 0.3 c.cm. of A.P.T. into the right upper arm. Eight weeks after the second dose of A.P.T. the subjects were bled for the third time and were again Schick-tested. The results of the Schick test were read usually 3 to 5 days later, and any person who still reacted positively was given another dose of 0.3 c.cm. of A.P.T.

Though this was the general plan of the observations, departures were made from it at Cambridge and at Sheffield for various reasons. At Cambridge in one series of students the third bleeding was made 6 weeks instead of 8 weeks after the second dose of A.P.T. In another set of students only active immunization was given. In still further sets of students additional bleedings were made 12 to 23 weeks after the second dose of A.P.T. In these instances the final Schick test was not performed till after the last bleeding had been done. At Sheffield the intervals between the two immunizing doses, and between the second dose and the third bleeding, were rendered very irregular owing to enemy action.

The relevant facts relating to the different sets of observations are set out in Table I.

TABLE I.—*Number and Type of Observations Made*

Set	Place	Time	Original No. in Group		No. of Units of Antitoxin	Time Interval in Weeks between			
			A	A+P		1st and 2nd Bleeding	2nd and 3rd Bleeding	2nd and 4th Bleeding	2nd Bleeding and Schick Test
TC	Turner's Court	Michaelmas, 1939	5	9	350	5	8	—	8
O1	Oxford	Hilary, 1940	10	10	400	4	8	—	8
C1	Cambridge	Lent, 1940	27	27	400	4	6	12	12
O2	Oxford	Michaelmas, 1940	8	8	500	4	8	—	8
C2	Cambridge	,, ,,	72	52	500	4	8	12 or 23	12 or 23
S	Sheffield	,, ,,	26	25	500	4–10	8–10	—	8–10
Total ..			148	131					

A=Active immunization. A+P=Combined active and passive immunization.

The total number of subjects recorded in the table is 279. In fact rather more took part in the trials, but in analysing our figures we have excluded all initially Schick-positive reactors whose serum contained 1/1,000 unit per c.cm. or more of antitoxin. The figures recorded in this paper refer exclusively to subjects whose serum at the time of the first immunizing injection contained less than 1/1,000 unit per c.cm. Unfortunately a history of immunization was obtained only from the O2 and C2 sets of students. Of these, 7 in the A group and 3 in the A+P group had been immunized or Schick-tested previously. Since none of them contained as much as 1/1,000 unit per c.cm. of antitoxin in their blood they have been included in our figures.

Results

Comparison between the Antitoxin Production of Groups A and A+P

In recording the results it will be convenient first of all to deal with those series of observations in which the original plan of the experiments was strictly followed.

In Table II are included the observations on Sets O1, O2, C1, and C2 of Oxford and Cambridge students who were bled 4 weeks after the first immunizing dose of A.P.T. or of A.P.T. plus serum. In this and in subsequent tables it has been thought wise, owing to the relatively small number of sera examined and the wide variations in the amounts of antitoxin contained in them, to report the results in simple frequency tables rather than to work out arithmetic mean titres. Here and throughout the paper all antitoxin figures are expressed per c.cm. of serum.

TABLE II.—*Oxford and Cambridge Students: Sets O1, O2, C1, and C2. Antitoxin Titres 4 Weeks after First Immunizing Dose*

Antitoxin Units per c.cm. of Serum	A	A+P	Total
	No.	No.	
Good response: 1/50 or more ..	14 (12%)	3 (3%)	17
Fair response: 1/100 to 1/500 ..	7 (6%)	57 (61%)	64
Poor or no response: 1/1,000 or less ..	95 (82%)	34 (36%)	129
Total	116 (100%)	94 (100%)	210

A=Active immunization with 0·1 c.cm. of A.P.T.
A+P=Ditto, plus 400 to 500 units of antitoxin.
$\chi^2=73{\cdot}527$. $P=<0{\cdot}000001$.
Note.—The term "response" is hardly justifiable in the A+P group, but its use is convenient.

It will be observed that the proportion of sera containing 1/500 unit or more of antitoxin was far higher in the A+P than in the A group—64% as opposed to 18%. In the small class of sera containing 1/50 unit or more, however, the relation was reversed. The difference in antitoxin distribution between the two groups is seen by the χ^2 test to be far greater than is likely to have arisen by chance alone.

These facts are best explained on the assumption: (*a*) that the antitoxin in the A+P group of sera was mainly residual antitoxin—i.e., the remains of the antitoxin that was injected four weeks previously; and (*b*) that a single dose of 0.1 c.cm. of A.P.T. gives rise to little or no antitoxin response within four weeks except in a very few persons who have had previous experience of the diphtheria bacillus; in these it acts like a secondary stimulus (Glenny, 1925, 1931; Glenny and Südmersen, 1921), and gives rise rapidly to a considerable amount of antitoxin. Evidence in support of assumption (*a*) will be afforded at a later stage of this paper. In support of assumption (*b*) are the observations of Paschlau (see above) and of Fraser (1940), who found that of 50 children who had been immunized 5 years previously and whose serum antitoxin content had fallen to below 1/50 unit per c.cm. all responded rapidly to the reinjection of a single dose of 0.1 c.cm. of toxoid, 80% within 5 weeks having more than 1/2 unit per c.cm. It is also supported by examination of the records of students in the O2 and C2 groups who gave a history of previous immunization or of Schick-testing. Of 7 such students in the A group all but one had 1/10 unit or over 4 weeks after injection, and of 3 such students in the

A+P group 2 had 1/10 unit or over. Unfortunately a record of the immunization histories of the O1 and C1 sets of students was not available.

The antitoxin titres in Sets O1, O2, and C2 of Oxford and Cambridge students 8 weeks after the second immunizing dose of A.P.T. are recorded in Table III.

TABLE III.—*Oxford and Cambridge Students: Sets O1, O2, and C2. Antitoxin Titres 8 Weeks after Second Immunizing Dose*

Antitoxin Units per c.cm. of Serum	A	A+P	Total
	No.	No.	
Good response: 1/50 or more ..	57 (65%)	22 (33%)	79
Fair response: 1/100 to 1/500 ..	20 (23%)	25 (38%)	45
Poor or no response: 1/1,000 or less ..	11 (12%)	19 (29%)	30
Total	88 (100%)	66 (100%)	154

A = Active immunization with 0·1 c.cm. and 0·3 c.cm. of A.P.T. at 4 weeks' interval.
A+P = Ditto, plus 400 to 500 units of antitoxin at time of first injection.
$\chi^2 = 15{\cdot}366$. $P = 0{\cdot}00047$.

The results are seen to be very different from those in Table II. Of those in Group A 65% had responded well by producing 1/50 unit or more of antitoxin, as against only 33% in Group A+P. The χ^2 test shows that such a difference in distribution can hardly have been due to chance.

It may therefore be concluded that, although 4 weeks after the first immunizing dose the average antitoxin titre is considerably higher in the A+P than in the A group, 8 weeks after the second injection the situation is reversed. From this the inference can be drawn that the administration of serum along with the first dose of A.P.T. leads to a lower antitoxin response, as determined by observations made 8 weeks after the second injection of A.P.T., than that due to A.P.T. alone.

We may now examine the results on all the subjects, including those that were not treated in strict accordance with the original plan. Table IV records the antitoxin titres on Sets TC, O1, O2, C1, C2, and S of students at Turner's Court, Oxford, Cambridge, and Sheffield, at an average of about 4½ weeks after the first immunizing dose.

TABLE IV.—*Turner's Court, Oxford, Cambridge, and Sheffield Students: Sets TC, O1, O2, C1, C2, and S. Antitoxin Titres 4 to 10 Weeks (average 4.4 Weeks) after First Immunizing Dose*

Antitoxin Units per c.cm. of Serum	A	A+P	Total
	No.	No.	
Good response: 1/50 or more ..	20 (14%)	7 (6%)	27
Fair response: 1/100 to 1/500 ..	11 (7%)	67 (52%)	78
Poor or no response: 1/1,000 or less ..	116 (79%)	54 (42%)	170
Total	147 (100%)	128 (100%)	275

A = Active immunization with 0·1 c.cm. of A.P.T.
A+P = Ditto, plus 350 to 500 units of antitoxin.
$\chi^2 = 68{\cdot}089$. $P = < 0{\cdot}000001$.

As in Table II, it is seen that the proportion of sera containing 1/500 unit or more of antitoxin was considerably higher in the A+P than in the A group—58% contrasted with 21%. And again as in Table II, more sera in the A group had a relatively higher antitoxin content than in the A+P group. The higher proportion, however, of sera in the A+P group containing antitoxin is shown to be significant by the χ^2 test.

In Table V are set out the antitoxin titres in Sets TC, O1, O2, C1, C2, and S at an average of 8¾ weeks after the second dose of A.P.T. As in Table III, the proportion of sera in Group A containing 1/50 unit or more of antitoxin is higher than in Group A+P—65% as compared with 50%—but the difference is not so great, and the lower value of χ^2 renders this difference of far less significance.

Judged by the percentage values the difference between the two groups in Table IV is slightly less than in Table II; this may perhaps be due to the fact that the average time of bleeding of the students recorded in Table IV was later than that in Table II. This, in turn, might be expected (*a*) to lead to a greater excretion of the antitoxin inoculated into the A+P group, and (*b*), on the assumption that serum delays the antitoxin response, to reveal the beginning of antitoxin production resulting from the first dose of A.P.T. in Group A.

TABLE V.—*Turner's Court, Oxford, Cambridge, and Sheffield Students: Sets TC, O1, O2, C1, C2, and S. Antitoxin Titres 8 to 12 Weeks (average 8.7 Weeks) after Second Immunizing Dose*

Antitoxin Units per c.cm. of Serum	A	A+P	Total
	No.	No.	
Good response: 1/50 or more ..	91 (65%)	59 (50%)	150
Fair response: 1/100 to 1/500 ..	36 (26%)	38 (32%)	74
Poor or no response: 1/1,000 or less ..	13 (9%)	21 (18%)	34
Total	140 (100%)	118 (100%)	258

A = Active immunization with 0·1 c.cm. and 0·3 c.cm. A.P.T. at 4 to 10 weeks' interval (average 4·4 weeks).
A+P = Ditto, plus 350 to 500 units of antitoxin at time of first injection.
$\chi^2 = 6{\cdot}938$. $P = 0{\cdot}031$.

Again, the difference between the two groups in Table V is less than in Table III; this may be related to the greater length of time that elapsed between the second immunizing dose and the final bleeding of the students recorded in Table V. If it is assumed that the serum delayed but did not prevent the antitoxin response of subjects in the A+P group, this would have allowed time for the formation of antitoxin in an amount more nearly approaching that of subjects in Group A. These suggestions are admittedly hypothetical, but evidence will now be brought to show that they are not without foundation.

It may be noted that the results in Tables II to V are weighted to some extent in favour of the A group by the circumstance that 7 students in the A group are known to have been immunized previously, as against only 3 in the A+P group.

Rate of Disappearance of Injected Antitoxin from the Circulation

At Cambridge 12 of the students in the A+P group, each of whom had received 0.1 c.cm. of A.P.T. and 500 units of antitoxin, and bled at weekly intervals for 4 weeks so as to determine the antitoxin content of their serum. The results are given in Table VI.

TABLE VI.—*Fall in Antitoxin Content of Serum within 4 Weeks of Inoculation of 0.1 c.cm. of A P.T.+500 Units of Antidiphtheria Serum. Part of Set C2*

Antitoxin Units per c.cm. of Serum	1 Week	2 Weeks	3 Weeks	4 Weeks
1/25 or greater	4	1	1	1
1/50	6	0	0	0
1/100	2	10	1	0
1/250	0	0	10	1
1/500	0	1	0	5
1/1,000	0	0	0	2
< 1/1,000	0	0	0	3
Total	12	12	12	12

It will be seen that, roughly speaking, after 1 week the commonest titre was about 1/50 unit, after 2 weeks about 1/100 unit, after three weeks about 1/250 unit, and after 4 weeks between 1/500 and 1/1,000 unit. Apart from one student who had been immunized three to four years previously and whose titre rose from 1/25 unit after 1 week to 1/5 unit after 2 weeks, it would appear that the antitoxin content of the serum fell progressively and that there was no obvious evidence of active formation of fresh antitoxin. At 4 weeks 75% still had 1/1,000 unit or more per c.cm. of serum.

These results may be usefully compared with those in Table II. After 4 weeks only 3 of the 94 subjects in the A+P group had an antitoxin titre of 1/50 unit or more, suggesting the formation of fresh antitoxin. The majority had a titre of between 1/100 and 1/1,000 unit, a total of 79%* having 1/1,000 unit or more. Since only 34%* of those in the A group had 1/1,000 unit or more, it is difficult to avoid the conclusion that the antitoxin present in the great majority of the A+P sera was residual antitoxin.

* These figures are obtained from the individual protocols.

This conclusion is further borne out by comparison of the results in Table VI with those of previous workers who have studied the rate of disappearance of injected antitoxin from the circulation. Most observations of this type appear to have been made on animals, but some, such as those by Ramon, Debré, and Bernard (1933) and E. Madsen (1936), were made on diphtheria patients who were injected with varying quantities of antitoxin for therapeutic purposes. Others, such as those by Frey and Schmid (1939), were carried out, like our own, on subjects who received active and passive immunization simultaneously. Smith (1907) seems to have been one of the few who made observations that were not complicated either by the presence of active disease in the subject or by simultaneous inoculation of an immunizing antigen; unfortunately his observations were limited to those on a single adult male.

Without discussing the results of these workers in detail, attention may be drawn to the work of T. Madsen (1902, 1923), who found that the rate of disappearance of antibody from the blood of passively immunized persons could be represented by an equation which was not unlike that of a monomolecular reaction. That is to say, a curve drawn by plotting the absolute values of antitoxin per c.cm. of blood against time fell rapidly to start with and then flattened out till it was almost parallel with the axis of abscissae. The rate of disappearance, however, varied not only with the amount of antitoxin injected but with the individual person studied. This second variable made it impossible to predict from the behaviour of one person what the rate of disappearance of antitoxin would be in another person. These conclusions of T. Madsen's were borne out by the work of E. Madsen (1936), and there is no reason to doubt their general validity.

The possession of a constant by each individual makes it difficult to compare the results of different workers with each other and with our own. When, in addition to this, other factors may have influenced the result, such as previous immunization against diphtheria by natural or artificial means, as in some of the subjects studied by Ramon and his colleagues, it is clearly impossible within a short compass to make any statistical comparison between the recorded figures of different workers. A general review of these figures, however, shows that when horse serum containing antitoxin is injected into the body a large proportion of it is excreted within the first two or three weeks, but that a small proportion generally persists for at least four weeks.

Perhaps the nearest parallel to our own figures are those given by Frey and Schmid (1939), who inoculated healthy children with 1,000 to 2,000 units of antitoxin intramuscularly together with 1 c.cm. of A.P.T. subcutaneously. All the children, it may be noted, had less than 0.0005 unit of antitoxin per c.cm. in their blood serum at the time of injection. In every child inoculated with antitoxic horse serum the titre fell from a maximum of 0.45 to 1.8 units after 3 days to a figure varying from 0.007 to 0.03 unit after 28 days. In none of them was there any evidence of a rise in the titre suggestive of active antibody formation.

Our own figures, it will be remembered, showed the presence of about 0.002 unit per c.cm. after 28 days. Considering that the amount of antitoxin inoculated into our students was only a half to a quarter of that used by Frey and Schmid, the rate of disappearance of antitoxin from the circulation appears to have been much the same in both groups. These figures are in general agreement with those obtained by Smith (1907) on a healthy adult, and by E. Madsen (1936) on diphtheria patients, whose curves were so regular as to exclude almost any possibility of active antitoxin formation within four weeks.

It may therefore be concluded that in healthy students having less than 1/1,000 unit of antitoxin per c.cm. of serum and inoculated with 0.1 c.cm. of A.P.T. and 500 units of antidiphtheria serum, any antitoxin found in the blood during the succeeding four weeks is probably residual antitoxin. Occasional students who have had previous experience of the diphtheria bacillus, directly or indirectly, may respond rapidly by the formation of considerable amounts of antitoxin, but apart from these there is little evidence to suggest that when given along with 500 units of antitoxic serum 0.1 c.cm. of A.P.T. is sufficient to stimulate the formation within four weeks of more than minimal quantities of antibody.

RATE OF FORMATION OF ANTITOXIN IN THE A AND A+P GROUPS

From the figures just recorded it is evident that, with the immunizing doses used, fresh antitoxin, except in minimal quantities, is unlikely to be detected within 4 weeks either in those given active immunization alone or in those given combined active and passive immunization. A study of Table III, however, shows that 8 weeks after the second immunizing dose most of the subjects had formed fresh antitoxin. Of those in the A group 88% and of those in the A+P group 71% had produced more than 1/1,000 unit of antitoxin per c.cm. of serum. The question arises whether the poorer response of those in the A+P group was due to real inhibition of antitoxin formation as the result of the simultaneous injection of serum with the first dose of A.P.T., or merely to delay in its formation. To answer this question antitoxin titrations were made at Cambridge on the two groups of students at different times after the second dose of A.P.T.

In the first set of students, C1, the third bleeding was made 6 instead of 8 weeks after the second dose of A.P.T., and a fourth bleeding was made 12 weeks after the second dose of A.P.T. The summarized results are given in Table VII.

TABLE VII.—*Change in Antitoxin Content of Serum between 6 Weeks and 12 Weeks after Second Immunizing Dose. Part of Set C1*

Antitoxin Units per c.cm. of Serum	A		A+P		Total Observations
	6 Weeks	12 Weeks	6 Weeks	12 Weeks	
1/2 to 2	2	2	1	0	5
1/5 to 1/25	4	4	2	6	16
1/50 to 1/250	6	8	11	10	35
1/500 to 1/1,000	2	1	3	4	10
< 1/1,000	1	0	3	0	4
Total	15	15	20	20	70
Rise		7		14	
Fall		3		2	
No change		5		4	

A = Active immunization with 0·1 c.cm. and 0·3 c.cm. A.P.T. at 4 weeks' interval.
A+P = Ditto, plus 400 units of antitoxin at time of first injection.
The figures in the last three rows are obtained from the individual protocols.

It will be noticed that in the A group there was a slight increase in the titre of antitoxin at 12 weeks, 7 sera showing a rise, 3 a fall, and 5 no change. In the A+P group, however, 14 showed a rise, only 2 a fall, and 4 no change. The suggestion is therefore very strong that the rate of formation of antitoxin is slower in the A+P than in the A group. It looks also as if in the A group the peak of antitoxin production is probably reached somewhere between 6 and 12 weeks.

In a second set of students, part of C2, antitoxin titrations were made 8 and 12 weeks after the second dose of A.P.T. The results are shown in Table VIII.

TABLE VIII.—*Change in Antitoxin Content of Serum between 8 Weeks and 12 Weeks after Second Immunizing Dose. Part of Set C2*

Antitoxin Units per c.cm. of Serum	A		A+P		Total Observations
	8 Weeks	12 Weeks	8 Weeks	12 Weeks	
1/2 to 2	2	2	1	1	6
1/5 to 1/25	24	23	5	8	60
1/50 to 1/250	13	13	17	25	68
1/500 to 1/1,000	7	9	12	9	37
< 1/1,000	2	1	11	3	17
Total	48	48	46	46	188
Rise		8		28	
Fall		19		4	
No change		21		14	

A = Active immunization with 0·1 c.cm. and 0·3 c.cm. of A.P.T. at 4 weeks' interval.
A+P = Ditto, plus 500 units of antitoxin at time of first injection.
The figures in the last three rows are obtained from the individual protocols.

The difference between the two groups is even more striking than in Table VII; of the A group only 8 sera showed a rise, whereas 19 showed a fall and 21 no change. In the A+P group the corresponding figures were 28, 4, and 14. The two conclusions reached from a study of Table VII are therefore considerably strengthened.

In a third set of students, part of C2, antitoxin titrations were carried out 8 and 23 weeks after the second dose of A.P.T. Unfortunately the observations, which are recorded in Table IX, were restricted to members of the A group.

TABLE IX.—*Change in Antitoxin Content of Serum between 8 Weeks and 23 Weeks after Second Immunizing Dose. Part of Set C2*

Antitoxin Units per c.cm. of Serum	A		Total Observations
	8 Weeks	23 Weeks	
2 and over	1	0	1
1/2 to 1	0	1	1
1/5 to 1/25	12	6	18
1/50 to 1/250	1	8	9
1/500 to 1/1,000	5	4	9
< 1/1,000	2	2	4
Total	21	21	42
Rise		6	
Fall		10	
No change		5	

A = Active immunization with 0·1 c.cm. and 0·3 c.cm. of A.P.T. at 4 weeks' interval.
The figures in the last three rows are obtained from the individual protocols.

The number of students was small, but it will be seen that rather more showed a fall in the antitoxin content of their serum than a rise. The six subjects that did show a rise were mainly those whose titres after 8 weeks had been very low.

Combining the figures for the antitoxin values at 12 weeks recorded in Tables VII and VIII, we may see whether the difference at this interval of time after the second dose of A.P.T. is as great as that recorded in Table III after 8 weeks (Table X).

TABLE X.—*Antitoxin Content of Serum 12 Weeks after Second Immunizing Dose. Set C1 and Part of C2*

Antitoxin Units per c.cm. of Serum	A	A+P	Total
	No.	No.	
Good response : 1/50 or more	46 (67%)	31 (44%)	77
Fair response : 1/100 to 1/500	20 (29%)	30 (43%)	50
Poor or no response : 1/1,000 or less	3 (4%)	9 (13%)	12
Total	69 (100%)	70 (100%)	139

$\chi^2 = 7{\cdot}915$. $P = 0{\cdot}0193$.

There is no question that the proportion of students in the A group having relatively high titres is greater than in the A+P group, but the difference is very much less than in Table III. Moreover, the value of χ^2 is considerably smaller. Eight weeks after the second dose the odds against obtaining by chance alone such a distribution as that figured in Table III were 2,128 to 1 against. Twelve weeks after the second dose, however, the odds against obtaining such a distribution as that figured in Table X are reduced to 52 to 1 against.

Taking together the results recorded in Tables VII, VIII, IX, and X, the following tentative conclusions may be drawn:

1. In Schick-positive students of the age and type that we are dealing with, doses of 0.1 and 0.3 c.cm. of A.P.T. at 4 weeks' interval give rise to antitoxin formation which, judged by the titre of the serum, reaches its height as a rule about 8 weeks after the second injection.

2. If an injection of 400 to 500 units of antitoxin is given with the first dose of A.P.T., antitoxin formation is considerably slower, and probably does not reach its maximum till 12 weeks or more after the second injection of A.P.T.

3. While no observations were made on students of the A+P group later than 12 weeks after the second injection of A.P.T., it would appear that up to this time, at any rate, the amount of antitoxin formed by members of the A group is rather greater than that by those of the A+P group. In other words, the simultaneous administration of serum with the first dose of A.P.T. not only delays the formation of antitoxin but probably inhibits it to some extent. The degree of inhibition, however, does not seem to be very great.

THE SCHICK-CONVERSION RATE AFTER IMMUNIZATION

Schick tests were carried out by inoculating 0.2 c.cm. of the toxin intradermally into the flexor surface of the left forearm and 0.2 c.cm. of the control toxin into the right forearm. The tests were usually read 3 to 5 days later, and the positive results were classified into four groups on the basis mainly of the diameter of the erythematous area.

Before immunization all students had less than 1/1,000 unit of antitoxin per c.cm. and all were Schick-positive. After immunization the Schick tests were carried out at different times. If we examine the results of those students who were retested 8 or 8 to 10 weeks after the second dose of A.P.T. (i.e., TC, O1, O2, and S sets) and those who were retested 12 weeks after the second dose (i.e., C1 and part of C2) we obtain the following results (Table XI):

TABLE XI.—*Result of Final Schick Tests 8 to 12 Weeks after Second Immunizing Dose : Sets TC, O1, O2, C1, Part of C2, and S*

Groups	Time after 2nd Dose of A.P.T.	Group A			Group A+P		
		No. Tested	No. Pos.	% Schick Conversion Rate	No. Tested	No. Pos.	% Schick Conversion Rate
TC, O1, O2, and S	8–10 weeks	48	2	95·8	50	4	92·0
C1 and part of C2	12 ,,	67	3	95·5	66	7	89·4
Total	8–12 weeks	115	5	95·7	116	11	90·5

Observed difference between A and A+P = 5·2%. Standard error of this difference = 3·3%. Observed difference divided by S.E. of difference = 1·6.

No obvious difference is to be seen between the Schick-conversion rate at 8 to 10 weeks and at 12 weeks. At both intervals Group A is slightly superior to Group A+P, but the differences are clearly not significant. It may be noted that the Schick-conversion rate even in the A group is not as high as that obtained in school children with the same dosage of A.P.T.—namely, 98%. The reason for this will be discussed in another paper.

RELATION BETWEEN THE SCHICK REACTION AND THE ANTITOXIN CONTENT OF THE SERUM

For the sake of interest we have analysed the Schick reactions as observed 8 to 23 weeks after the second dose of A.P.T. in terms of the antitoxin content of the serum of the subjects tested. The results are set out in Table XII.

TABLE XII.—*Relation of Schick Reaction to Antitoxin Content of Serum 8 to 23 Weeks after Second Immunizing Dose. Sets TC, O1, O2, C1, C2, and S*

Antitoxin Units per c.cm. of Serum	Schick Reaction				Approximate Percentage Positive
	No. Tested	++	+	Total Positive	
1/10–>2	74	—	—	—	0
1/25	46	—	—	—	0
1/50	34	—	—	—	0
1/100	27	—	2	2	7
1/250	25	1	—	1	4
1/500	22	—	3	3	14
1/1000	12	1	4	5	42
< 1/1,000	9	3	4	7	78
Total	249	5	13	18	7

It will be seen that subjects whose serum contained 1/50 unit or more per c.cm. all reacted negatively to the Schick test, and that 2 out of 9 subjects whose serum contained less than 1/1,000 unit likewise gave a negative reaction. As previous observers have found (see Parish and Wright, 1938), the zone over which a positive or a negative Schick reaction may be registered is very wide, so that the Schick reaction affords no precise indication of the antitoxin content of the serum. It is true to say, however, that though a Schick-negative response may be obtained in a subject with less than 1/1,000 unit of antitoxin, it is uncommon for a Schick-positive response to be obtained in a subject with 1/100 unit or more, and very uncommon with 1/30 unit or more.

Discussion

These results require little discussion. On the whole they are in conformity with the earlier findings of Ramon and his colleagues working with tetanus anatoxin and antitoxin, and with those of Martin, Loiseau, and Laffaille (1928) and of Gierthmühlen and Voges (1939) working with

diphtheria toxoid and antitoxin. They show that the administration of antitoxic serum along with A.P.T. leads both to a delay and to some degree of inhibition in the formation of fresh antitoxin.

It is interesting to speculate on the cause of this effect. In view of the observations by Glenny, Buttle, and Stevens (1931) on guinea-pigs, the suggestion might be made that in our experiments the dose of A.P.T. used—0.1 c.cm.—at the first injection was so small that it was to a large extent neutralized by the simultaneously inoculated serum. That it was not all neutralized is clear from the fact that the great majority of the subjects in the A+P group were sensitized, and responded to a second injection of 0.3 c.cm. of A.P.T. The difference between the A and the A+P groups may therefore have been essentially a difference in the degree of sensitivity produced by the first dose. The members of the A group were highly sensitized, and responded to a second dose by rapid and fairly liberal production of antitoxin: members of the A+P group, on the other hand, were less highly sensitized, and responded by a slower and less liberal production of antitoxin. If this explanation is correct it follows that a larger dose of A.P.T. given at the first injection to members of the A+P group might lead to a higher degree of sensitization and therefore to a diminution or complete abolition of the difference in rate and amount of antitoxin production between members of the A and A+P groups. The truth of this hypothesis is happily open to trial, and it is proposed to test it in further experiments.

From the practical point of view it may be objected that the inhibitory effect of serum renders the method of combined active and passive immunization of doubtful value. If there occurs in the human being the same sort of intermediate stage of relative susceptibility between the disappearance of passive and the development of active immunity as Gundel and König (1938) observed in guinea-pigs, then it may be doubted whether the simultaneous injection of serum with the first dose of A.P.T. presents any considerable advantage over ordinary active immunization. The answer to this question is dealt with by Fulton and his colleagues in Part II of this paper—"Control of Epidemics in the Field"—in which it is shown that, provided the inoculated children are protected from the risk of infection for six weeks after the first dose of A.P.T. by the removal of carriers of the diphtheria bacillus, the chances of their developing diphtheria during the stage of passive immunity or during the subsequent stage of relative susceptibility before active immunity has developed are reduced to a minimum.

Summary and Conclusions

From a study of the literature there appears to be a considerable measure of disagreement between different workers on the value of combined active and passive immunization against diphtheria or tetanus. Much of this confusion has resulted from the use of different methods of experimental approach to the problem.

Our observations were made on a total of about 300 medical students of 20 to 22 years of age at Oxford, Cambridge, and Sheffield, and students of 14 to 19 years at a farm training college.

The subjects were first Schick-tested. All positive reactors were bled, and the antitoxin content of each serum was determined. Immediately after bleeding, the students were inoculated either with 0.1 c.cm. of A.P.T. alone (A group) or with 0.1 c.cm. of A.P.T. and 350 to 500 units of diphtheria antitoxin given simultaneously into opposite arms (A+P group). Four weeks later all students were again bled, and then received 0.3 c.cm. of A.P.T. A third bleeding and a final Schick test were carried out as a rule 8 weeks after the second injection, but this interval was varied somewhat for special purposes.

In analysing the results all students having 1/1,000 unit or more of antitoxin per c.cm. of blood serum at the time of the first inoculation were excluded. Altogether, therefore, observations were available for study on 148 subjects in Group A and 131 in Group A+P.

With the exception of a few in both groups who had presumably had previous experience of the diphtheria bacillus, and who responded rapidly by the production of considerable amounts of antitoxin, none of the students formed more than minimal quantities of antitoxin in the interval between their first and second injections. During this interval the average antitoxin content of the serum of the members of the A+P group fell from about 1/50 unit one week after injection to between about 1/500 and 1/1,000 unit per c.cm. 4 weeks after injection.

After the second injection of A.P.T., antitoxin was formed more rapidly and in rather greater quantity by the A than by the A+P group. The difference in antitoxin content between the two groups 8 weeks after the second injection was highly significant, but after 12 weeks it was far less striking.

The peak of antitoxin production was reached in the A group about 8 weeks after the second dose of A.P.T. In the A+P group antitoxin production was much slower, and probably did not reach its maximum for about 12 weeks.

The Schick-conversion rate 8 to 12 weeks after the second dose of A.P.T. was 95.7% in the A and 90.5% in the A+P group. This difference is not statistically significant.

So far as can be judged from the type of subject examined and the scale of dosage used in our observations, it may be concluded that the simultaneous administration of anti-diphtheria serum with the first dose of A.P.T. leads to a delay and to a slight degree of inhibition in the formation of antitoxin. The final degree of immunity, however, does not appear to be much inferior to that resulting from active immunization alone.

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[*Part II, on Control of Epidemics in the Field, will appear next week.*]

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FOUR CASES OF PNEUMOCOCCAL PERITONITIS

BY

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Acute pneumococcal peritonitis is an uncommon disease. The use of surgery with the administration of sulphapyridine illustrates an advance which has taken place in the treatment of this type of peritonitis during the last few years. Before the introduction of Felton's type antipneumococcal serum and sulphapyridine, pneumococcal peritonitis was an extremely fatal disease. Following the administration of the serum a certain number of these patients got well, and there is a distinct hope that the introduction of sulphapyridine will further reduce the mortality.

When I was house-surgeon to Mr. H. J. (now Sir Holburt) Waring I was able to collect, with Mr. A. L. Moreton, 6 cases of this disease that had been admitted to Mr. Waring's wards, all of which were fatal (Noon and Moreton, 1912). Similar results were recorded by other observers.

Rischbieth (1911) gives statistics of 57 cases of pneumococcal peritonitis. Of these, 45 were cases of acute general peritonitis, with a mortality of 100%.

Sir Dyce Duckworth and Mr. H. Marsh (1904) recorded a case successfully treated by operation and antipneumococcal serum. They refer to other cases, none of which, however, recovered. Up till 1932 further cases of acute pneumococcal peritonitis came under my care, but all proved fatal. Since 1932 I have had 4 cases, all of which have recovered. These seem to be of sufficient interest to justify publication. Three of them were treated by laparotomy with drainage of the pelvic cavity and intramuscular injections of antipneumococcal serum, Felton's type, and the fourth by laparotomy with drainage and the administration of sulphapyridine. While, however, the first three gave rise to considerable anxiety and recovered only after a long illness, the fourth caused no anxiety and made a rapid recovery.

Case I

Pneumococcal peritonitis. Laparotomy; protracted pyrexia. Recovery

A schoolgirl aged 8 was admitted to the Norfolk and Norwich Hospital on April 6, 1932, complaining of severe abdominal pain with vomiting. On the day before admission she was said to have received a severe blow in the abdomen when returning from school.

On admission she looked ill; her temperature was 101.5°, and the pulse rate 124. The abdomen was distended, rigid, and tender. A diagnosis of acute peritonitis was made. The abdomen was opened, revealing acutely inflamed intestine and a large collection of thick yellow pus in the pelvis. The appendix, which was not inflamed, was removed. The abdomen was closed, with drainage. Examination of pus showed a pure culture of pneumococcus, Type II.

She was treated by injections of antipneumococcal serum, Types I and II (Parke, Davis), 10,000 units being given daily from April 7 to 12. She made satisfactory progress, and was discharged from hospital in good health on June 4.

Case II

Acute pneumococcal peritonitis. Laparotomy; double empyema; right side of chest drained; left side aspirated. Complete recovery

A school teacher aged 23 was admitted to a nursing home on June 5, 1933, complaining of severe abdominal pain and diarrhoea. Temperature 104°; pulse rate 120. She had been ill for four days.

On examination she looked ill and anxious; her temperature was 102.8° and pulse 140. The abdomen was distended, rigid, and tender. An abdominal operation scar showed that the appendix had been removed some years ago. A provisional diagnosis of acute pneumococcal peritonitis was made. The abdomen was opened and the peritoneal covers of the intestine were found to be red and inflamed. There were some flakes of lymph and some flocculent inodorous pus. The latter was mopped up and the abdomen closed with drainage. An intramuscular injection of 20,000 units of antipneumococcal serum was given, with a further 10,000 units on June 6 and 10. On July 3 the blood leucocyte count was 28,400 per c.mm. Signs at the base of the right lung continued to increase. On July 7 a right-sided empyema was drained by the resection of a piece of rib. Improvement followed this operation. About two weeks later signs began to develop at the base of the left lung, and purulent fluid was aspirated. Accumulation of fluid did not recur. The empyema wound on the right side of the chest continued to discharge. The patient left the nursing home on August 14, after a very severe illness lasting ten weeks. She gained weight, and finally recovered completely.

Case III

Acute pneumococcal peritonitis. Laparotomy; protracted pyrexia. Recovery

A schoolgirl aged 9 was admitted to the Norfolk and Norwich Hospital on March 12, 1937, complaining of acute abdominal pain and vomiting.

On examination she looked ill; her temperature was 102° and pulse rate 128. The abdomen was not distended, but was rigid and tender. A diagnosis of acute peritonitis was made. The abdomen was opened, and the small intestine was seen to be covered with flaky lymph. The appendix, which was not inflamed, was removed and the abdomen closed with drainage. Examination of pus revealed pneumococci. Blood culture following the operation grew pneumococci. The patient was given 10,000 units of antipneumococcal serum intramuscularly for three days following operation, and made gradual progress towards recovery, being discharged on May 29.

Case IV

Acute pneumococcal peritonitis Laparotomy; post-operative treatment with sulphapyridine

A female laundry worker aged 18 was admitted to the Norfolk and Norwich Hospital on October 2, 1940, complaining of acute abdominal pain, vomiting, and diarrhoea. She had been ill for three days.

On examination she looked anxious; her face was flushed and the tongue rather red and dry. The temperature was 104° and the pulse 160. The abdomen was somewhat distended, with marked tenderness below the navel and to the right of the midline. A diagnosis of general peritonitis, cause uncertain, was made. The abdomen was opened on the day of admission. The peritoneal surface of the intestines was red and inflamed; there were also some inflamed and enlarged mesenteric glands in the region of the caecum. The appendix was not inflamed, but was removed. There was some inodorous yellowish-green pus in the pelvis; this was removed. The abdomen was closed, with pelvic drainage. Examination of the pus revealed pneumococci.

The pneumococcal infection was treated with sulphapyridine, given partly by mouth and partly intravenously. Between October 2 and 6 36 grammes were administered as follows: First day, 4 grammes; second day, 10 grammes; third day, 8 grammes; fifth day, 12 grammes; sixth day, 2 grammes. The dosage was determined by the clinical signs of the severity of the infection. The wound continued to discharge until November 1, but by November 6 it was healed. The patient's local and general condition continued to be satisfactory, and she was able to leave hospital.

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CUTANEOUS ANTHRAX TREATED BY ARSENICALS AND SULPHAPYRIDINE

BY

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Cases of cutaneous anthrax are rare, and few have been recorded in which modern chemotherapy was used. The following case is therefore placed on record.

Case Report

The patient, a gardener aged 53, was admitted to hospital on January 25, 1941. Some years previously he had had a succession of small boils, but had been free of these for four years. A week before admission he noticed a small pimple on the back of his neck which at first looked and felt like the early stages of a boil. The evening before admission the pimple quickly extended and the surrounding area swelled rapidly. There was not the severe pain he had experienced with previous boils. During the next twenty-four hours the swelling extended to each side of the neck, and he vomited on several occasions. His doctor suspected anthrax and referred him for institutional treatment.

On admission, late in the evening, the patient was found to have a blood-stained vesicular lesion about an inch in diameter on the back of his neck. The vesicle was not tense and the overlying cuticle was crenated. There was solid oedema of the surrounding parts, extending to the interscapular region, to the occiput, and to the lateral aspect of the neck in front of the sternomastoids, the swelling being very noticeable on viewing the patient from the front (Fig. 1). His temperature was 102.4° F. and the pulse rate 108. His tongue was moist but slightly furred. Despite the alarming appearance of the lesion the patient did not look markedly toxic or distressed. There was nothing of note in the mouth, heart, and lungs; the spleen was not enlarged, and there was no albumin in the urine.

Shortly after admission smears and cultures were made from the fluid beneath the crenated surface of the lesion, and an examination of the straight films showed Gram-positive cocci and Gram-negative bacilli in abundance and a few rod-shaped Gram-positive organisms. The culture after twelve hours showed the typical "dried cotton-wool" appearance of anthrax, and stained slides from culture were typical of the anthrax bacillus.

On the morning of January 26 a full course of sulphapyridine was started, with 2 grammes as an initial dose, followed by 1 gramme four-hourly for forty-eight hours, and then 1 gramme three times a day for thirty-six hours. Latterly he was given 0.5 gramme three times a day for four days, making a total dosage of 24.5 grammes. On the day after admission 10 c.cm. of Sclavo's anti-anthrax serum was given subcutaneously into the abdominal wall. Arsenic was also given, intravenously, in the form of neokharsivan in doses of 0.6 gramme on the second, third, and sixth days after admission. Leucocyte counts on the second, fourth, and sixth days after admission were: 11,000, 16,800, and 9,200 per c.mm. respectively.

The condition of the lesion had not altered to any marked degree on the 27th (Fig. 2), but the temperature and the pulse rate were normal and remained so until the patient left hospital.

By the 30th the patient looked and felt much better, and there had been no toxic effects following the administration of sulphapyridine. The oedema had very largely subsided, the original lesion being a bluish-black scab, the edges of which were beginning to separate. Only with difficulty could the pathologist find material for the platinum loop. Below the original lesion there was a large flat blood-stained blister (Eurich, 1933) containing gelatinous sanious material (Fig. 3). Cultures taken from the scar and blister at this stage yielded abundant growths of *Staphylococcus aureus*, but both were negative for *Bacillus anthracis*. By February 2 the original lesion was still drier. The central eschar was further separated, and was surrounded by a pale slightly raised ring.

The patient was discharged on February 7. There was only slight residual induration from the occiput to the interscapular region behind, and the dry scab had almost completely separated, exposing a healed eschar. The blood blister had by this time completely disappeared. When seen a month after discharge the patient was quite well; there was a healed area to mark the site of the original lesion, with some little induration, especially on the right side.

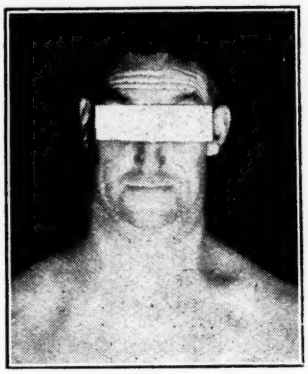

FIG. 1.

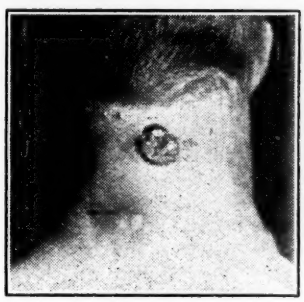

FIG. 2.

FIG. 3.

FIG. 1.—Photograph taken two days after admission, showing the oedema described in the text.
FIG. 2.—Photograph of the lesion two days after admission.
FIG. 3.—Photograph of the lesion on the sixth day after admission.

The diagnosis of anthrax was confirmed by inoculation of a guinea-pig, which died within forty-eight hours, the heart blood and spleen giving cultures positive for anthrax.

Commentary

The situation of the lesion and the occupation of the patient are interesting but not unique, as there was a report in the *Lancet* (1938, **1**, 1417) of an inquest on June 4, 1938, on a market gardener aged 30 who died in the Manchester Royal Infirmary from anthrax septicaemia following a lesion on the back of the neck. The jury returned a verdict of death by misadventure, but added a rider that death had been caused by handling artificial manure.

Investigations so far have failed to reveal the source of anthrax in the case under consideration, but the supposition is that the patient's hands were infected by some article with which he had been working, and so had infected the small lesion on the neck direct or through the agency of the coat collar. Samples of vine and plant manure, bone meal, and bird food mixture containing dried meat and foreign flies, with which the patient had been working, were cultured direct on to media and subcultured, but nothing suggesting anthrax was discovered. Further cultures were made after subjecting samples to 3% caustic potash, and others to boiling, with the object of reducing ordinary micro-organisms, but without success. Farmyard manure with which he had also been working came from

a farm where there had been no case of anthrax among the animals.

The low incidence of anthrax is indicated by infectious diseases returns. According to the annual report of the Chief Inspector of Factories and Workshops only 30 cases were notified in 1936, and the average mortality in the cutaneous form over a period of thirty years has been from 3.3% to 24.3% (Legge, 1934), hence the importance of recording individual cases in order to assess the value of therapeutic measures.

The question of sulphanilamide therapy in anthrax has recently been brought to the forefront by the work of Cruickshank (1939), Bonnar (1940), and others, and it was intended at the outset to treat the case by sulphapyridine alone in order to attempt to support the contention that cases of cutaneous anthrax could be successfully treated by this means (Thrower, 1941). "As the conditions essential to clinical trial are almost impossible to fulfil," and one has to consider treatment primarily in the interests of the patient as his life is at stake, the line of treatment adopted included arsenicals, which the literature appears to indicate as being of distinct value, and also Sclavo's serum. The latter can probably be disregarded on account of the small quantity given, the available supply being limited.

Osgood, Joski, and Brownlee (1940) have shown that arsenic and sulphathiazole form the most effective combination against *Staph. aureus* in bone-marrow cultures, and this suggests that the combination of arsenic and sulphanilamide may be worthy of further clinical trial in the treatment of cutaneous anthrax.

My thanks are due to Mr. J. N. J. Hartley, under whose care this case was treated, for permission to publish this paper, and to Dr. J. Steven Faulds, who confirmed the diagnosis by film, culture, and guinea-pig inoculation, and by whom the photographs were taken.

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DARK ADAPTATION AND MINERS' NYSTAGMUS

BY

IAN CAMPBELL, M.B., Ch.B.

The association between failure of dark adaptation, or night-blindness, and miners' nystagmus has long been recognized, and has been commented upon by many observers. C. Turner Thackrah (1831), writing of colliers, remarks: "Their eyes . . . are intolerant of full light." Court (1891) states: "A definition of the disease [i.e., miners' nystagmus] should include night-blindness, nystagmus . . . because these symptoms all occur together in miners working with the inferior light." The First Report of the Miners' Nystagmus Committee, 1922, states: "This failure of dark adaptation, or night-blindness, is undoubtedly one of the most characteristic symptoms of the disease"; whilst Roche (1931) states: "One of the first symptoms of nystagmus is deficient vision at twilight. All miners suffering from nystagmus complain of twilight blindness."

That hemeralopia is found in the "pre-nystagmus" stage is observed in the Departmental Committee's Report on the Workmen's Compensation Acts, 1938: ". . . there are some men who ultimately develop oscillations of such extent as to become cases of miners' nystagmus who have complained of earlier subjective symptoms such as mal-projection, intolerance of light from lamps of other workers, difficulty of seeing on entering the mine workings or leaving them."

Weekers in 1910 even suggested that failure of dark adaptation was the cause of miners' nystagmus (First Report of Miners' Nystagmus Committee, 1922). Oglesby (1880) stated: "I was at first impressed with the idea that pigmentation of the retina lay at the root of the mischief," but discarded his theory on negative ophthalmoscopic findings. Ohm in 1916 considered that "disturbances of dark adaptation have proved factors which *predispose* to nystagmus" (First Report of Miners' Nystagmus Committee, 1922).

Though most observers have noted the occurrence of night-blindness in miners' nystagmus, few have suggested an explanation of it. Jeaffreson (1887) states: "The interference [i.e., obstruction of the blood flow through the vertebral arteries] with the nutrition of the visual centres may be one of the chief features in the production of hemeralopia, which is almost always present." Roche (1931) suggests that it is probably due to two causes: (1) "The stratum pigmentum produces visual purple. As a result of continuous over-production these cells become defective and nearly cease to secrete altogether, or they secrete a visual purple which is too diluted and ceases to stimulate the rods on exposure to light." Or: (2) "Normally, several rods have only one central nerve connexion, and continued use provokes fatigue, and consequently poor transmission of impulses." The Third Report of the Miners' Nystagmus Committee, 1932, on the other hand, considers the night-blindness of miners' nystagmus to be one of the psychoneurotic manifestations of this disease.

Association of Diet and Miners' Nystagmus

Recent work done on the association between deficiency of vitamin A and night-blindness leads me to consider the association of diet and miners' nystagmus. On this subject Martin (1920) believes that "exhaustion, due to want of food and prolonged physical strain, is the most important, most effective predisposing cause of the disease"; while Stephens (1932) considers the *nature* of the miners' food all-important. His views he expresses thus: "Since the introduction of tinned foods and preserved meats, the feeding of the collier is much below what it used to be. Formerly the Welsh collier used to live on good home-grown produce, with *milk*, *eggs*, and *cheese* . . . [italics mine]. To-day ill-feeding tinned foods are the chief features of the household board in a large number of homes, and it is from these homes that the army of nystagmus patients is recruited."

Investigations of the diet of miners in this area show that with the improvement in housing conditions, giving most miners a garden of their own, in which they are keenly interested and proficient, the supply of vitamin A (or its precursor) from green vegetables, carrots, etc., is in the summer months plentiful, but in the winter months, when this home-grown source is at a minimum, the intake of vitamin A is greatly reduced. It is just at this time also that the seasonal variation in the vitamin A value of dairy produce manifests itself. As stated in *The Vitamins* (Crookes Laboratories), "the vitamin A value of milk, butter, and eggs tends to be at its lowest in the early part of the year." Further, when the intake of vitamin A is at its lowest the demand for it, in the interest of vision, is at its highest, for the miner in the dark winter months has a greater need for dark adaptation *apart* from the time actually spent below ground.

It is interesting to note that many observers have found miners' nystagmus to be more prevalent in the dark winter months. The following table, from the First Report of the

Miners' Nystagmus Committee, supports this view. For the last entry I am indebted to Mr. W. E. Gillhespy. I have converted the numbers into percentages.

Cases Arranged according to the Quarter of the Year in which Failure Took Place

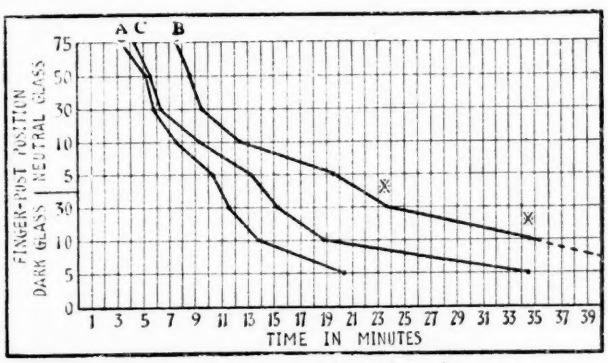
	No. of Cases	1st	2nd	3rd	4th
Dransart and Famechon ..	201	33·33%	17·91%	17·41%	31·34%
Ohm	521	30·51%	26·29%	20·34%	22·64%
Llewellyn	1,649	34·26%	18·79%	22·61%	24·36%
Yorkshire Coal Owners Indemnity Society (1930-9 inclusive)	1,847	30·44%	26·06%	22·19%	21·24%

These figures in each case show that more failures occur in the first quarter of the year.

Deficient Illumination the Essential Factor

It is now generally recognized that the chief factor in miners' nystagmus is deficient illumination, and that "during all the years when the miner is working at the coal face his macular vision is in more or less complete abeyance" (Departmental Committee's Report on the Workmen's Compensation Acts, 1938). This means that vision is mediated by the rod elements of the retinal periphery, calling for an adequate secretion of visual purple, which, in turn, demands an adequate blood supply of vitamin A.

The following experiment was carried out with the use of Crookes's dark-adaptation tester (for description of tester see *Trans. ophthal. Soc.*, 1938, **58**, 103). Three people living on an ordinary mixed diet were tested and an average curve taken. This was accepted as the normal for the instrument used. Ten miners, all working, were selected at random apart from being of a "nystagmus age." The average age for the group was 38, and the average number of years worked underground 23. An average curve was plotted for this group. Three were selected from this group, one of whom, it was noted, had oscillations in daylight, at the horizontal level, before exercises. These were put on intensive vitamin A treatment until each was able to see the arrow at the lowest finger-post position used. An average curve was then plotted for this group. (See Graph. At finger-post position 30 and 10, in Curve B, two and five



Graph showing results of dark-adaptation tests.
Curve A = Average 3 normals.
Curve B = Average 10 colliers.
Curve C = Average 3 colliers after additional vitamin A.

colliers respectively were unable to see the arrow after 40 minutes. To arrive at an average time for the ten, these were included as *having* seen the arrow at 40 minutes, so that, properly, this curve should go further to the right.)

The same technique was followed in each case: half an hour seated in the dark, four minutes' "bleaching," and up to 40 minutes' examination. All the tests were done in January or February of this year, and between 8 and 10.30 p.m. The finger-post positions used were: light neutral glass, 75, 50, 30, 10, 5; dark glass, 30, 10, 5—corresponding to an intensity of illumination of 0.7, 0.47, 0.28, 0.093, 0.047, 0.028, 0.0093, 0.0047 millifoot candle respectively. The results are shown in the following table:

Table showing Results of Dark-adaptation Tests (Time in Minutes)

Case	Age	Occupation	Finger-post Position: Neutral Glass 75	50	30	10	5	Dark Glass 30	10	5
			3 Normals:							
A	38	Housewife	3.25	5.45	7.40	9.40	13.50	14.20	16.20	17.35
B	16	Clerk	3.35	6	6.15	9.25	11.20	13.20	14.55	18.20
C	31	School teacher	2.55	3.45	3.57	4.18	6.10	6.50	10.30	24.25
			10 Colliers:							
1	35	Collier	9.15	9.30	12.10	13.55	24.30	27.20	—*	—*
2	36	,,	7.55	9.03	9.30	12.40	35.10	36.30	—*	—*
3	36	Onsetter	8.35	8.55	10.10	12.10	14.59	15.55	23.15	—*
4	43	Shot-firer	8.02	10.05	10.40	12.55	18.10	19.40	30.35	—*
5	30	Loader	5.55	7.30	8.35	9.35	17.29	—*	—*	—*
6	61	Packer	13.25	13.55	14.20	19.30	30.10	—*	—*	—*
7	36	Trammer	4.28	5.10	6.50	8.43	11.55	12.20	21.10	—*
8	42	Haulier	6.30	8.10	8.25	10.25	12.55	13.45	39.30	—*
9	29	Collier	5.45	6.55	8.35	10.55	15.25	16.30	34.55	—*
10	40	,,	7.05	7.40	8.25	12.50	15.10	16.15	—*	—*
			3 Colliers after Treatment:							
1	35	Collier	3.30	5.02	5.32	7.10	15.10	16.10	20.20	27.10
2	36	,,	5.30	7.10	7.45	11.10	13.05	17.20	20.50	38.50
9	29	,,	3.15	4.10	5.30	9.20	11.50	12.25	15.30	38.10
Average for 3 Normals			3.18	5.10	5.57	7.47	10.26	11.30	13.55	20.06
,, ,, 10 Colliers			7.47	8.41	9.41	12.17	19.35	23.49*	34.55*	—*
,, ,, 3 Colliers after treatment			4.05	5.27	6.15	9.13	13.06	15.18	18.53	34.43

The average results are shown in the graph.

Cases A and B each had for two days before the test 4 capsules vitamin A (oral) a day. Case C neither had, nor was taking, any vitamin preparation.

The times marked * signify that the arrow was not seen up to 40 minutes. To estimate an average time, the dark glass being used and the finger-post at 30 and 10, those failing to see the arrow after 40 minutes were counted as *having* seen it at 40 minutes. The last two average figures given should therefore be greater than shown.

Case 9 results were given after taking 6 capsules vitamin A (oral) Crookes a day for seven days; Case 2 results after 3 capsules a day for three days followed by 6 capsules a day for a further nine days; Case 1 readings were given after 6 capsules a day for 27 days. He was examined weekly, and, as mentioned, had the oscillations of miners' nystagmus in daylight, at the horizontal level, before exercises.

These observations show that in the group of miners selected a deficiency of vitamin A, as demonstrable by the dark-adaptation test, was present, and by the administration of vitamin A over a limited period the power of dark adaptation was considerably improved.

As the miner depends for his working vision, and safety, on his retina periphery, and must continually adapt to low illuminations and sudden changes in light intensity, it seems desirable that he should receive an optimum supply of vitamin A. This need is further enhanced, in my opinion, by the peculiar tendency of the collier to develop miners' nystagmus.

I am indebted to Dr. Edith Hatherley for her useful advice, and to Crookes Laboratories for the use of a dark-adaptation tester.

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S. Wolff (*Ann. Pediatr.*, 1941, **4**, 155) records an epidemic of streptococcal disease, apparently unparalleled in the literature, which occurred in the Children's Hospital at Eisenach. Of eight children affected two died. All the patients fell ill on the same day (September 26, 1935) and almost at the same hour. Seven started with a throat infection. The course was identical, especially as regards the temperature. Sulphanilamide was very effective except in the two fatal cases. The cause of the outbreak could not be discovered.

Medical Memoranda

Encephalomyelitis in a Case of Pink Disease

Although the symptoms and signs of pink disease are well known the cause is not yet established. Rocaz, however (*Pink Disease*, 1933, p. 129, supports the idea of an encephalitis due to a neurotropic virus. When it is considered that outbreaks of the disease take the form of individual cases scattered through any one area, the disease certainly does resemble poliomyelitis and polio-encephalitis in some respects. There is, however, little evidence of direct transmission from one child to another, and it is not usual for two members of a family to be affected. Another curious point to note is that the outbreaks are often limited to industrial areas, and occur among the children of the artisan class, although there is no observable relation to poverty. It is notable, too, that the disease only affects young children. The following case is interesting in that the necropsy supports the idea that an encephalomyelitic lesion was the cause of the symptoms and signs.

Case Report

A child aged 1 year, one of a family of seven children, came from an industrial area; the father was a meter collector earning £2 18s. a week. The child had had infantile eczema for six months, and had been losing weight for the past fortnight. He had been breast-fed, but weaned on to cows' milk, gravy, potatoes, milk puddings, etc. Had been suffering from diarrhoea for two weeks, with green foul-smelling stools. Had a cough for a week; no vomiting. Also suffering from insomnia, and profuse sweating especially in the head region.

Condition on Admission.—The child was somewhat dehydrated, and showed great hypotonia of the muscles, with flaccidity and wasting. There was a rash, typical of pink disease, on the trunk, face, and legs. The child was irritable, scratching and rubbing the affected areas continually. The hands and feet were cold, pink, and shining. There was some desquamation. The general appearance suggested a case of pink disease of considerable severity and duration. Chest: poor resonance at both bases, with fine rales. Tongue furred. Abdomen retracted.

The illness ran through five weeks, with extreme asthenia and insomnia. Later the case gave a clinical picture of pink disease of a very severe type. Death took place from general debility and cardiac failure.

Post-mortem Examination.—Dr. William Susman reported as follows: Body extremely emaciated. Pericardium: complete absence of fat; is of a greyish colour due to toxins. Heart: myocardium, rather pale but firm; tricuspid valve, 1 finger; pulmonary valve, healthy; mitral valve, 1 finger, healthy; aortic valve, healthy. Right lung: posterior aspect of upper and lower lobe shows appreciable amount of haemorrhage. Left lung: posterior aspect of lower lobe has peripheral zone of haemorrhage about 2 cm. in depth which extends the whole length of the lobe. Microscopically a confluent bronchopneumonia. Air passages: some frothy mucus present. Alimentary passages: oesophagus, nothing abnormal; stomach, passive congestion; small intestine, nine agonal intussusceptions; large intestine, nothing abnormal. Liver, intense passive congestion. Gall-bladder healthy. Common bile duct patent. Pancreas congested. Spleen, nothing abnormal. Thyroid atrophied. Thymus very atrophic. Adrenals healthy. Right kidney and left kidney, fairly pronounced degree of passive congestion. Pia arachnoid acutely congested. Brain: grey matter throughout is acutely congested: in the basal nuclei the red appearance has a greyish mottled background; the grey matter of the pons and medulla is also acutely congested; the appearances are those of an acute encephalomyelitis.

The microscopical report was as follows: Abdominal sympathetic chains: there is some recent degeneration in the ganglion cells and in some nerves; surrounding muscle tissue that has been included in the section shows some scattered foci of subacute myositis. Cerebrum: there is a most intense and generalized acute congestion associated with a widely disseminated acute encephalomyelitis. The lesions are most pronounced in the basal ganglia. The perivascular region of many arteries shows sclerosis and in some a pronounced degree of fibrosis. The cerebellum, pons, medulla, and spinal cord are similarly affected but to a lesser degree. Many nerves show parenchymatous degeneration.

Comment

The presence of a severe encephalomyelitis of a standing which corresponds to the duration of the illness due to pink disease is important as indicating the likelihood of a virus infection. The history of a gastro-intestinal infection is noteworthy, and in my experience is not uncommon.

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An Unusual Sequel to Blood Transfusion

The following case, in which attacks of insanity followed blood transfusions, may be considered worth recording.

Case History

A married woman aged 41, *in extremis* with extensive carcinoma of the cervix, was admitted to hospital for radium treatment under Mr. Ellis, by whose permission the case is submitted. Her subsequent pulse rate varied between 90 and 125, respirations between 24 and 31, and temperature between 98° and 102°, remaining normal for the whole week before her death from massive collapse of the lungs. Pyuria was present throughout. Sulphanilamide and iron were administered intermittently. Blood examination on admission—Group O (IV)—showed 22% haemoglobin, 1,800,000 red cells, 16,000 white cells, colour index 0.61, with anisocytosis and poikilocytosis. The blood urea was 43 mg. per 100 c.cm. Three days after admission she received by drip two pints of citrated Group O blood (one day old), with about half a pint of saline, over six hours. Her condition afterwards was good and no rigor occurred. During the next week abdominal discomfort became more pronounced, and a kaolin poultice was applied. The haemoglobin four days after transfusion was 42%. A projected cervical diathermy was abandoned ten days after transfusion on account of her poor condition. Sixteen days after the transfusion radium was inserted into the growth under evipan and omnopon anaesthesia. During the next fortnight her haemoglobin fell from 30% to 18%; her condition was then very bad and vomiting was frequent. A second blood transfusion, similar to the first, though the blood was a few days older, was then given. There was no rigor and she had a good night. Next evening the nursing staff, who had found her a most quiet and reasonable patient, without any sign of mental derangement, noted "strangeness in her manner." She was in a confused and restless state for the next three days, talking nonsense, trying to get out of bed and, at one time, remaining in a sitting posture, with arms katatonically extended before her, for half an hour. Her temperature at this time lay between 99° and 100°. She became mentally normal again within a week of this second transfusion and remained so till a third transfusion of three pints of citrated blood was given a fortnight later. A sharp rigor followed this transfusion, and she showed slight jaundice later, but had a good night. Next day she was again insane, and continued in a noisy delusional state (alleging, for instance, that she had swallowed several sets of dentures) for four days, after which she became and remained mentally normal till her death one month later. Necropsy revealed no cerebral abnormality. An organizing fibrinous general peritonitis was present, the fibrin being particularly thick on the under surface of the diaphragm. The pelvic contents were bound into a solid mass of inflammatory and carcinomatous tissue. No metastases more distant than the glands at the aortic bifurcation were found. There was unilateral hydronephrosis due to a nodule of growth in the right ureter. The blood urea post mortem was 69 mg. per 100 c.cm.

The most likely explanation of the two sudden and temporary attacks of madness, following blood transfusions, appears to be in terms of delirium due to low-grade peritonitis. But the precipitating effect of the transfusions in a patient at all other times mentally normal was regarded as a (perhaps) previously unrecorded phenomenon.

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Reviews

HOSPITAL DEFICITS

The Hospitals Year-Book, 1941. Central Bureau of Hospital Information, 12, Grosvenor Crescent, S.W.1.

Hospitals, so prompt in doing their work, seem to be extraordinarily tardy in reporting on it. Thus the *Hospitals Year-Book, 1941,* which appears in September of that year, embodies the statistics of hospitals only up to the end of 1939, and even for that year they are incomplete. Of the 750 voluntary hospitals in England and Wales outside London only just over 600 have sent in returns in the form requested by the Central Bureau of Hospital Information, and of the 124 hospitals in Scotland only 75 have done so. In a number of cases the difficulty is explained by the fact that, in spite of repeated appeals, the hospitals have neglected to base their accounts on the calendar year. However it arises it is a great pity, because it leaves the picture of the service and of the financial position of the voluntary hospitals unfinished. In London the hospital secretaries are more co-operative, and of the 158 voluntary hospitals all but five have made the necessary returns. These show that the number of new in-patients in 1939 was 240,622, and of new out-patients just upon 1,700,000. The financial position in London is not, on the face of it, very satisfactory. The total receipts, lumping together capital and maintenance accounts, amounted to £5,366,462, but the expenditure was more than half a million more. In the Provinces the receipts and expenditure more nearly balanced, and in Scotland there was a surplus of over a quarter of a million. If capital costs be disregarded, however, the position is much better, with a small surplus on maintenance in London, as against a deficit the year before, and quite handsomely increased surpluses in the rest of Great Britain. There is a remarkable steadiness in the way in which hospitals are supported by voluntary gifts; but expenditure increases at a greater rate than income, and the recurring deficiency in the working of some of the metropolitan hospitals is becoming a serious problem, the more so when the heavy war taxation is contemplated, a factor which hardly makes itself felt in the figures for 1939. Of the London teaching hospitals nine showed surpluses in the year under review, but two others—the Royal Free and Westminster—had deficits of £22,000 and £21,000 respectively; the Royal Northern had a deficit of £23,000, and Queen Mary's of £10,000; while in the Provinces the Queen Elizabeth Hospital, Birmingham, had a deficit of £34,575, and the Royal Berkshire Hospital, Reading, one of £10,400. All these deficits were on maintenance account. Rather more than half of the hospitals of London show deficits, just over one-third of the hospitals in the Provinces, and one-fifth of the hospitals in Scotland.

Lord Plender, who writes the financial review this year in place of Sir Charles Harris, says that a partial remedy for this serious state of affairs may be found in regional controlling organizations, which in his view not only should be advisory but should have power in cases of proved need to exercise a measure of control over expenditure. He adds that this method might not be acceptable to many hospitals, in which case the local authorities should be requested to assist out of the rates. Even such measures might not prove adequate in the existing and post-war situation, and it may become necessary for the State to make grants in aid, as is clearly foreshadowed in the recent statement by the Minister of Health on Government post-war hospital policy. Lord Plender believes that the system of regional councils and a central council, now being promoted by the Nuffield Provincial Hospitals Trust on the recommendation of the Sankey report, will help to solve the difficulties, and this is a view held in many responsible quarters.

The *Year-Book,* which contains the usual directory, is as useful as ever and more exciting than before, for it includes vivid illustrated accounts of the bombing of St. Thomas's Hospital and the Coventry and Warwickshire Hospital. Lord Horder contributes a short article on shelter hygiene, and Sir Alfred Webb-Johnson, P.R.C.S., one on the role of auxiliary hospitals and convalescent homes in wartime.

PRICE'S MEDICINE

A Textbook of the Practice of Medicine. By Various Authors. Edited by Frederick W. Price, M.D., F.R.C.P. Sixth edition. Oxford Medical Publications. (Pp. 2,032. 38s. net.) London: Oxford University Press. 1941.

It is a great achievement, for which editor, contributors, and publishers must be congratulated, that *A Textbook of the Practice of Medicine,* by various authors and edited by Dr. F. W. Price, should have appeared in its sixth edition despite the trials and tempests of the past two years. Four new contributors have joined the team and three of the original writers of sections have died since the last edition. Much fresh matter has been introduced, and there are evidences of much rewriting of sections. A valuable innovation concerns a standard plan for the names of drugs (in which Mr. H. Davis, Ph.D., has collaborated). English names (*B.P.* 1932 or one of the Addenda, or the *B.P.C.*) have been used throughout, and on the first occasion on which the official name is mentioned in a section on the treatment of any particular disease this is followed by the name in the *U.S. Pharmacopoeia,* and then, in brackets, the names of the most widely known proprietary preparations of corresponding composition. There are twelve new illustrations, all concerned with electrocardiography, but the general size of the book remains the same. Monographs appearing for the first time include such subjects as pink disease, rupture of the intervertebral disk, and the heart in hypothyroidism. The haemorrhagic diseases have been reclassified, and there are other rearrangements and some new features in nomenclature. Altogether this is a worthy product of the London school of medicine—a most valuable textbook, and fully deserving of a wide sale.

UROLOGY

Office Urology. With a Section on Cystoscopy. By P. S. Pelouze, M.D., Assistant Professor of Urology, University of Pennsylvania. (Pp. 766; 424 figures; 1 plate. 50s. net.) Philadelphia and London: W. B. Saunders Company. 1940.

This is an excellent book on diagnostic and medical urology, especially suited to senior students, general practitioners, and such urologists as are too prone to think almost exclusively in terms of surgery. The illustrations and print are admirable, but the book is rather heavy to handle.

Professor Pelouze's pages are packed with sanity, humour, and tolerance for misplaced enthusiasm. Gentleness is persistently praised: "It is better to be a physician who does not cause shreds than one who tries to clear them up." Healthy scepticism is shown in saying that "the idea that one can tell safely from the size and shape of a shred just what part of the canal it came from is much like the old dream that one could tell from the microscopic study of urinary cells exactly in which section of mucous membrane they originated." Most diagnoses of necrospermia, we are told, are erroneous, and neglect the fact that "individuals who have not had an emission of semen for two weeks or longer commonly show no sperm motility." Among minor errors one may note "Pezzar" instead of de Pezzer (pp. 17 and 424), "Harry" instead of Hurry Fenwick (p. 155), "Thomas Walker" for Thomson-Walker (p. 175), and "diverticuli" for diverticula (p. 386). In Fig. 324 surely the prostatic lobe shown is the left, not the right.

The author is rather fond of "obtunded" for blunted. In Fig. 85, showing a smear from "non-gonococcal urethritis," we are told that the Gram-negative diplococci present (many of which are intracellular) are much larger than gonococci; but with such suspicious appearances one would presumably not exclude gonorrhoea merely by slight variation in size. One may not agree with the statements that the upper pole of the epididymis is the one most commonly affected by tuberculosis; that vesical papilloma rarely causes bleeding until the villi are long enough to be caught in the bladder sphincter; that in intravenous urography a compressing abdominal air cushion should be used; or that there are bladder stones too dense to be crushed.

Prostatectomists should remember that factors in increased frequency of micturition in the elderly may be loss of bladder elasticity, flabbiness of abdominal muscles, diminution of renal ability to concentrate urine, and also prostatophobia. Of rejuvenation methods the author says: "Drawing the line between what is true sex invigoration and what is psychologic sex stimulation in one who simply feels better is beyond the possibility of science." The part played by imagination in urethroscopy, and the ability of the instrument to produce many of the appearances seen, are emphasized. Finally, the reader is wisely advised not "to think of patients solely as urogenital systems around which God has draped a few other functioning structures." But it is impossible briefly to do justice to this challenging volume, which contains valuable chapters on the psychic factors of urogenital symptoms, on the sexual problem, and on cystoscopy and roentgenography, and which should be read by all interested in urology.

Notes on Books

A monograph by Dr. TORFINN DENSTAD on the Importance of Radiological Investigation in Cardiology, with Special Reference to the Significance of Cardiac Enlargement, is published as a supplement (No. XL) to *Acta Radiologica* (Stockholm, Sw. cr. 8). In this the author stresses the value of radiology in estimating the degree of cardiac enlargement in heart failure and, hence, as an aid to prognosis. Radiological investigation is of special importance in cases in which progressive cardiac enlargement is not accompanied by a corresponding deterioration in the clinical picture. In general, the author regards radiology as of more significance than electrocardiography, with the obvious exception of infarction. In hypertension, he says, the size of the heart and the symptoms are of more prognostic importance than the height of the blood pressure. Mitral defects, acute rheumatic carditis, chronic pericarditis, aortic aneurysm, thyrotoxicosis, and auricular fibrillation are among the other conditions which are dealt with from the radiological aspect.

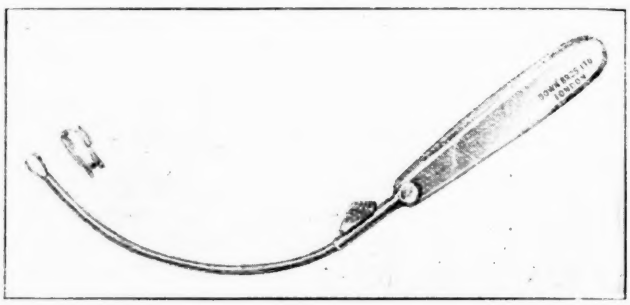
Sokol: The Czechoslovak National Gymnastic Organization, by F. A. TOUFAR, is published at 6d. by George Allen and Unwin. The wonderful Sokol movement was founded and grew during the years of national rebirth and development and became closely associated with modern Czechoslovak culture. Though a non-political organization, it had, because of its democratic and progressive activities, come to play an important part in the political life of the nation. It was a national movement which included men, women, and children, and its object was to harden them physically and to train them in self-control, voluntary discipline, and moral firmness. Largely due to Sokol, its splendid organization, its ideology, and its results, the Czechoslovak nation became known abroad under its own name. This booklet gives a concise and clear statement of the whole movement. The immensely improved standard of physical fitness in our Forces which has followed the introduction of physical training shows the potential benefits we could gain by a nation-wide adoption of Sokol. It stands for individual, local, and national happiness.

Preparations and Appliances

TWO-MINUTE SUPRAPUBIC CYSTOTOMY

Dr. GRAHAM HUMBY writes from the Hospital for Sick Children, Great Ormond Street:

The classic operation for suprapubic cystotomy seems rather elaborate for such a common procedure, and so a simple "grab" bougie has been designed to complete the operation in two minutes.

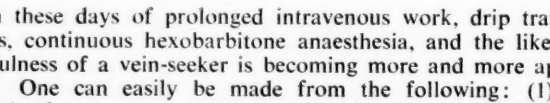


The bougie is passed into the bladder and pressed against the abdominal wall just above the pubis—there is no need to fill the bladder with water; the jaws are then opened and the tissues overlying the gap in the jaws are incised (1/2-in. incision). This allows the jaws to protrude through the abdominal wall: the de Pezzer is then clamped by the jaws and pulled back into the bladder: the jaws are loosened and the bougie withdrawn from the urethra. No stitches are necessary.

AN EASILY MADE VEIN-SEEKER

Captain W. NORMAN TAYLOR, M.B., B.S., D.A., R.A.M.C., writes:

In these days of prolonged intravenous work, drip transfusions, continuous hexobarbitone anaesthesia, and the like, the usefulness of a vein-seeker is becoming more and more apparent. One can easily be made from the following: (1) the barrel of a 1 c.cm. syringe, preferably all-glass to facilitate boiling; (2) a short length of soft rubber tubing of suitable size to fit over the syringe; and (3) a small serological test tube



about the same size as the syringe. The diagram shows the three parts fitted together, and with an intravenous needle attached.

Sterilization can be done by boiling or immersing the parts separately in an antiseptic solution, followed by a rinse in sterile saline. For use the apparatus is filled with sterile normal saline or citrate solution. The simplest method is to draw the saline from a rubber-capped bottle—for example, an old "novutox" bottle—which is held upside down, so that the needle of the vein-seeker points upwards. In this way air bubbles will not get into the apparatus.

When full of saline or citrate the central rubber portion of the apparatus is squeezed and the needle inserted under the skin over the vein. Then on releasing the rubber a negative pressure is created. The needle is then inserted into the vein, the blood automatically flowing back into the syringe. The needle should be pushed along the lumen of the vein for a short way to make sure it is well in. (This type of vein-seeker can be firmly fixed by strapping over the syringe and over the serological tube.) The injection or transfusion is then made into the rubber portion, which thus forms an artificial vein readily accessible. A fresh piece of rubber tubing should be used for each operation, otherwise it may leak through previous puncture holes.

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THE SPRUE SYNDROME

Many diseases (amoebiasis and undulant fever, for example) formerly thought to be confined to the Tropics are now found in Northern countries, and it seems probable that sprue, which for over half a century has been regarded as a typical product of the Tropics, may also have a much wider distribution. In its geographical range tropical sprue is mainly found in the Far East—India, China, Malaya, Ceylon—and to a lesser extent in South America and the southern States of the U.S.A., but is rare in Central Africa. Europeans, especially those long resident, are particularly liable to attack, without predilection for sex. Sprue begins mostly in the middle decades of life, small children being free from the disease. It is characterized by glossitis, stomatitis, steatorrhoea, meteorism, emaciation, and a steadily progressing anaemia of the pernicious type. Biochemical studies point to a general breakdown of digestion and assimilation; there is therefore failure to absorb fats, sugar, and calcium, while the hydrochloric acid and pepsin of the gastric juice are diminished and often, as in pernicious anaemia, absent altogether, and the intrinsic factor is missing (Castle and Townsend[1]). There are two facts about sprue which especially confuse the issue of its aetiology. The first is its remarkable latency, for it may declare itself in a former denizen of an endemic area twenty-five years or even longer after return to a temperate zone; the second is its liability to relapse after many years of freedom from symptoms.

During the last fifty years theories as numerous as the remedies advocated have been advanced as to the origin of sprue, implicating diet, worms (*Strongyloides stercoralis*[2]), yeast infection (*Monilia psilosis*[3]), "dry rot" in houses (a very popular theory in Ceylon), and the faeces of termite ants (Jepson[4]). As to the pathology of the disease, many of the changes in the epithelium of the small intestine formerly considered specific are ascribed to agonal and post-mortem changes so liable to occur in tropical countries. No readily ascertainable pathological changes[5,6] are demonstrable in the intestinal tract, but on microscopical examination there is usually evidence of chronic inflammation. The essential lesion appears to reside in the ileum, which is generally much distended with gas, the walls being atrophic and diaphanous. The absence of a distinctive pathological picture brings sprue into line with idiopathic steatorrhoea,[7] pernicious anaemia, and pellagra, with which it has many clinical features in common. But the sprue syndrome can be mimicked by other dissimilar processes involving the ileum and interfering with its normal functions: such are mesenteric tuberculosis, lymphadenoma, ulceration, malignant disease, gastro-jejuno-colic fistula, or a badly functioning gastro-jejunostomy. In fact, whenever a state of "chronic jejuno-ileal insufficiency" is brought about the clinical and biochemical features of tropical sprue are reproduced (Bennett and Hardwick[8]). This applies not only to tropical sprue but to coeliac disease in children and idiopathic steatorrhoea in adults. Since 1932 the possibility of a disease identical with tropical sprue but distinct from idiopathic steatorrhoea (with bone changes and deficiency of vitamins D and K) has been discussed by Hess Thaysen[9] in Denmark and in Northern Europe. He claimed that non-tropical and tropical sprue were identical as they had the same pathology and were amenable to the same lines of treatment. This conception is not hard to entertain if it is accepted that the sprue syndrome results from damage to the villi of the small intestine, and this has been confirmed by Markoff,[10] who has reported the supervention of sprue in a patient in Switzerland from whom 1.5 metres of the ileum had been removed surgically.

Pellagra presents a medical conundrum which may be taken as an analogue of sprue. As is well known, this is a comparatively common disease of tropical and subtropical countries in rural inhabitants subsisting upon an unbalanced dietary deficient in protein, and it is curable by nicotinic acid. In many features pellagra resembles sprue in the association of glossitis and stomatitis, frequent diarrhoea with occasional steatorrhoea, achlorhydria, and sometimes with anaemia of the pernicious type. In its geographical distribution pellagra frequently overlaps sprue. Thus Wood[11] showed that pellagra and sprue are closely associated in the southern States of the U.S.A., and other observers (Manning[12]) have described a mixture of sprue and pellagra in the West Indies as *Psilosis pigmentosa*, while it is certain now that the pellagra syndrome (with characteristic dermatitis) may be grafted upon sprue as also upon coeliac disease and idiopathic steatorrhoea.[13] In pellagra mouth symptoms may long precede the fully developed disease, and these cases have been termed "larval pellagra" or "prepellagra." In a substantial number the fully developed picture of pellagra may never ensue, though equally amenable to nicotinic acid

[1] *Amer. J. med. Sci.*, 1929, **178**, 764.
[2] *Arch. Méd. nav.*, 1877, **27**, 35.
[3] *Amer. J. trop. Dis.*, 1913, **1**, 146.
[4] *Ceylon J. Sci.*, 1931 Section D, **3** 3.
[5] *A Report on Researches on Sprue in Ceylon.* By P. H. Bahr. Cambridge, 1915.
[6] *Ind. J. med. Res.*, 1929, **16**, 799; *Trans. roy. Soc. trop. Med. Hyg.*, 1934 **27**, 340.
[7] *Trop. Dis. Bull.*, 1941, **38**, 123.
[8] *Lancet*, 1940, **2**, 381.
[9] *Non-Tropical Sprue.* By T. E. H. Thaysen. Copenhagen: Levin and Munksgaard. London. 1932.
[10] *Schweiz. med. Wschr.*, 1940, **70**, 1137.
[11] *Amer. J. med. Sci.*, 1925, **169**, 28.
[12] *Trans nat. Conf Pellagra.* S. Carolina Bd. H'th., Columbia, 1909.
[13] *Dysenteric Disorders.* By P. H. Manson-Bahr. Cassell and Co., 1939, p. 368.

therapy. Manson-Bahr[14] claims that the same localized manifestations may appear in sprue and should therefore be known as "presprue" or "larval sprue." In a fairly high proportion the pellagrous manifestations are secondary to destruction of the absorptive surface of ileum and large intestine by tuberculosis, chronic amoebic or bacillary dysentery, or even surgical intervention. Hence the incidence of pellagra appears to depend not so much upon the lack of nicotinic acid in the diet as on the failure of the intestinal mucosa to absorb it.[15]

Pernicious anaemia must also be considered in its relation to sprue. That these two diseases are closely related there can be no reasonable doubt. Certain typical cases of sprue subsequently develop anaemia indistinguishable from Addisonian anaemia, so that it has even been suggested that sprue may represent pernicious anaemia in tropical residents. But the latter is most common in the Northern Hemisphere, being altogether absent in the Tropics. Pernicious anaemia is often accompanied by glossitis similar to that of sprue and pellagra, and this is also amenable to nicotinic acid therapy.

The response of tropical and non-tropical sprue to the same therapeutic measures surely affords an index to their identity and also a clue as to aetiology. Manson-Bahr[16] now claims that nicotinic acid (300 mg. daily) combined with liver therapy constitutes the best method of curing sprue, thereby indicating a link between it and pellagra; that sprue should mainly on this account be regarded as a vitamin deficiency; and that, as in pellagra, there can be recognized (1) primary sprue (the naturally occurring disease), and (2) secondary sprue (secondary to some previous damage to the intestinal tract)—in other words, "chronic jejuno-ileal insufficiency." Possibly, as in pellagra, the sprue syndrome is caused not so much by absence of necessary vitamins in the diet as by non-absorption, so that in cases where this damage has been extensive it may be necessary to inject nicotinic acid.

What, then, is the true aetiology of sprue? Is it a specific virus which primarily attacks the intestinal epithelium and damages its functions, or may sprue supervene upon various forms of gastro-enteritis due to the dysentery group—as, for instance, to Sonne infection? This is suggested because in a small proportion of cases recovering from dysenteric attacks a temporary sprue-like clinical syndrome with stomatitis and steatorrhoea may be observed. The production of steatorrhoea in the sprue syndrome is naturally dependent on the mechanism of fat absorption. The emulsified fats are ingested directly by the epithelial cells of the villi, where the fat is split into fatty acids and glycerol, absorbed, and then resynthesized. Phosphorylation of fats takes place on the epithelial covering of the villi itself. Therefore the absorption of fats will be lessened, or even prevented, if the surface epithelium is damaged or its functions impaired. In this instance faeces will contain mostly split fat, as in the sprue group and the conditions which may simulate it. It may well be that it is in defects of this process of phosphorylation that the true mechanism of sprue and allied states arises. Whether it is in some way connected with disturbed suprarenal action (Verzár[17]) or with the hormone output of the pituitary (Vedder[18]) must be at present considered hypothetical.

[14] *Lancet*, 1940, **2**, 317
[15] *Lond. Hosp. Gaz* (Clin. Supp. June), 1941, **44**, 2.
[16] *Trans. roy. Soc. trop. Med. Hyg.*, 1941, **34**, 347.

DRUGS AND THE AUTONOMIC NERVOUS SYSTEM

The work of Dale and of Loewi on cholinergic and adrenergic nerve-endings, which operate through the momentary liberation of chemical substances, ushered in a new era in pharmacology. Well-known facts about the action of such drugs as atropine and eserine received a new interpretation, and it was realized that drugs could act positively by facilitating and negatively by inhibiting these chemical reactions at the nerve-endings. Then E. C. Dodds showed that simpler compounds could have the same effect either to a less or even a greater extent than the natural hormones. He compared the basal substance capable of producing the biological effect to a skeleton key which picked the physiological lock. All this has greatly stimulated research on synthetic compounds capable of producing more selective responses than the natural ones employed by the body. Thus on the cholinergic side "doryl," the methane of choline, has more effect on the gastro-intestinal tract and bladder and less on the cardiovascular system than acetylcholine. It has therefore been found useful in post-operative intestinal atony. Mecholin, a methyl compound of acetylcholine, on the other hand, acts more on the latter system and less on the former than doryl. It has therefore been useful in tachycardia, while ionized through the skin it has relieved the pain of constricted arteries or of phlebitis. F. R. Fraser has made a useful classification of the acetylcholine substitutes into those with an action like muscarine and those acting like nicotine. Prostigmin owes its success to preventing the destruction of acetylcholine at the nerve-ending more effectively than the natural physostigmine.

Recently M. L. Tainter[19] has critically reviewed the drugs having a sympathomimetic effect on adrenergic endings. Of these, ephedrine and benzedrine (amphetamine) are well known; less well known are cobefrin, neosynephrin, and propadrine. Of these five cobefrin has the greatest pressor effect and propadrine the least. As an aid to local anaesthesia cobefrin is five times and neosynephrin twenty times more powerful than adrenaline. As a decongestive adrenaline is too constrictive and is followed by too much secondary vasodilatation and irritation, so that ephedrine is more popular for this purpose, though benzedrine is also effective; the elaborate preparations of this and of neosynephrin and propadrine have no advantage over their solution in normal saline. For the relaxation of bronchial spasm none of these synthetic drugs is as powerful as adrenaline; nor have they any advantage as mydriatics, while they relax gastro-intestinal musculature only in such doses as to affect the circulation.

[17] *J. Physiol.*, 1935, **84**, 41 P.
[18] *Amer. J. trop. Med.* 1940, **20**, 345.
[19] *J. Amer. med. Ass.*, 1941, **116**, 2769.

A study of the absorption and fate of this group of drugs has led to some interesting conclusions. A very efficient vasoconstrictor naturally limits its own absorption, while if a preparation is chemically unstable it is destroyed by the digestive juices or in the liver; therefore oral administration can be effective only if the drug is chemically stable and not too vasoconstrictive. Ephedrine, benzedrine, and propadrine fulfil those conditions, while neosynephrin is much less effective by that route. Those with a catechol or phenolic nucleus—namely, adrenaline, adrenalone, and cobefrin—are almost completely inactive by the mouth; together with neosynephrin they are mostly destroyed in the body by whatever route administered. On the other hand, those without a hydroxyl linkage on the benzene ring—for example, ephedrine, propadrine, and benzedrine—resist decomposition more completely and are to be found in the urine. As the duration of action depends on the ease with which the body can destroy or eliminate them the former group should be used when brief action is required, the latter for more prolonged effects. The toxicity of this group depends on (*a*) the production of excessive hypertension, with its cardiac consequences; and (*b*) stimulation of the central nervous system, producing nervousness, excitement, tremors, and insomnia. As to the former, adrenaline has the most deleterious effect, and the margin of safety of any other preparation increases with the degree of its departure from the structure of that substance. As to the latter, benzedrine (especially the dextrorotatory) is most toxic, ephedrine (especially the laevorotatory) comes next, adrenaline and cobefrin last. The others have no nervous effects in therapeutic doses.

It should be added that W. M. Cameron and J. Kasanin[10] strongly criticize the inclusion of benzedrine in the sympathomimetic group of drugs on chemical, pharmacological, and therapeutic grounds alike. They hold that the presence of a catechol or closely allied nucleus is essential to such inclusion, whereby ephedrine equally comes under their ban. Pharmacologically benzedrine acts directly on smooth muscle and in other ways than through sympathetic channels. The gap between therapeutic action and toxicity is narrow, and its effect is cumulative. They admit, however, its value in narcolepsy, post-encephalitic Parkinsonism, and certain intoxications, but not in neuroses or schizophrenia. A caution should be uttered as to addiction. Tainter points out that cocaine was used long before this danger was recognized, and that heroin was introduced as a cure for morphine addiction. Indeed, the recognition of addiction has always lagged considerably behind the introduction of a drug—and barbiturates might be cited as another example of this. The danger of benzedrine addiction is now becoming generally recognized. Tainter maintains that of all nerve stimulants acting centrally benzedrine qualitatively most resembles cocaine in this respect.

Here we are evidently at only the beginning of a valuable inquiry. To determine the conditions governing absorption and selective action of drugs acting on the autonomic nervous system is to increase notably the precision and effectiveness of therapeutics.

[10] *New Engl. J. Med.*, 1941, **224**, 544.

CLINICAL STUDIES WITH RADIOACTIVE PHOSPHORUS

Early this year[1] we commented on the speed with which the new tools of the physicist were being applied to biochemical and therapeutic investigations, and now in a further series of papers from the University of California comes an excellent example of the progress which can be achieved when several departments of a university work actively together. The Berkeley cyclotron produces radioactive phosphorus P^{32} in sufficient quantity to be used not only in "tracer" doses—doses too small to cause detectable changes in the metabolism of the cells wherein they are retained—but also in "therapeutic" doses which significantly alter cell metabolism because of the quantity of beta-radiation spontaneously emitted. P^{32} has a half-life period of 14.3 days, and 1 microcurie is equal to 37,000 beta particles per second; the lethal dose for a 20-gramme mouse is about 70 μc. when given intraperitoneally in a sodium phosphate solution. Lawrence and his co-workers[2] find that 8 μc. is a safe tracer dose in the mouse in that it does not alter the cell metabolism, but as the dose is increased the percentage of it retained in the cells diminishes, indicating that cell metabolism is being affected. Leukaemic mice retain more P^{32} than normal animals, but the difference between the percentages retained when "tracer" doses of 8 μc. and when "therapeutic" doses of 80 μc. are given is much alike in the two groups of mice, so that here there is no difference in the radiosensitivity of the metabolic processes studied in the normal animals as compared with those in the leukaemic animals. Lawrence foresees the use of this technique in the study of the radiosensitivity of the metabolism in various tissues, and in comparing the effects of different types of radiation such as *x* rays and neutrons.

In a study[3] of four normal individuals and of twenty-seven patients with leukaemia the metabolism of P^{32} is found to be similar to that observed in mice; but even the smallest dose (540 μc.) administered to a leukaemic patient caused a reduction in the number of leucocytes, so that the doses were not "tracer" doses and their effects on cell metabolism must be interpreted with caution. Patients with leukaemia retain more P^{32} than normal individuals; when given by mouth most of the P^{32} is excreted in the faeces, and in the urine when given intravenously, but the total excretion in normal persons is the same for either route of administration. Leukaemic patients, however, excrete far less after intravenous than after oral administration, as the P^{32} is apparently more quickly fixed in the pathological tissues. Another practical point is that the amount of P^{32} retained tends to fall as the quantity of non-radioactive phosphorus P^{31} accompanying its administration is increased, so that to obtain a high concentration of P^{32} in circulating white blood cells it should be given intravenously and accompanied by the smallest possible amount of P^{31}. Determinations of the amounts of P^{32} retained in the acid-soluble, phospholipid, and nucleoprotein fractions of the leukaemic cells indicate that it is taken up first by the acid-soluble substances, and after forty-eight hours passes from these to those of nucleoprotein and phospholipid character. The marrow retains P^{32} in higher concentrations than does the blood, which is understandable, but the finding that in myeloid leukaemic cells the nuclei retain four times as much as the cytoplasm, whereas in lymphoid leukaemic cells the amounts in the nuclei and cytoplasm are the same, is unexplained.

The clinical results in the leukaemic patients are not recorded in this paper, but are doubtless similar to those

[1] *British Medical Journal*, 1941, **1**, 368.
[2] *J. clin. Invest.*, 1941, **20**, 577.
[3] Ibid., 1941, **20**, 567.

already reported.[4] In a further paper,[5] however, on six patients with polycythaemia rubra vera, it is shown that the haemoglobin content and the red and white blood cell counts are brought nearly to normal levels after amounts of P^{32} varying from 12 to 50 mc. Very marked clinical and symptomatic improvement accompanied the haematological changes, and periods of remission up to a year are recorded. The retention of P^{32} in the red blood corpuscles is the same in the polycythaemic patients as in normal individuals, and it is its concentration in the bone marrow which produces the favourable clinical results. The increased amount of spongy bone in the patients would account for the finding that the quantity of P^{32} excreted by them in the urine and faeces is much less than in normal individuals; here the report[6] of a case of polycythaemia in which marked thickening of the skull occurred over a period of six years is of interest. Since radiophosphorus has never produced nausea, vomiting, or any clinical ill effects after its administration, this form of therapy would seem to be the most acceptable for polycythaemic patients at the present time.

BOVINE TUBERCULOSIS IN AUSTRALIA

With the object of ascertaining the present frequency of tuberculosis of bovine origin in Australia, R. Webster[7] has typed tubercle bacilli cultivated from 370 miscellaneous specimens sent to the Commonwealth Health Laboratories in Melbourne for diagnosis. Although pulmonary tuberculosis may occasionally be due to the bovine type of tubercle bacillus, sputum was excluded from this investigation in order to concentrate it on those forms of the disease which are known to be more often of bovine origin. Among the 306 patients from whom the cultures were obtained 183 were adults, and in all of them, whatever the site of infection, the organism was of human type. Among 123 children there were only 11 with infections due to the bovine type: in one of these patients it was recovered from both a bronchial and a mesenteric gland; the remaining 10 were all examples of cervical adenitis. Tuberculous meningitis, of which there were 57 cases in children and 8 in adults, was invariably due to bacilli of the human type, as were tuberculosis of the urinary tract (17 cases in children and 117 in adults) and bone-and-joint tuberculosis (20 cases in children and 45 in adults). It is apparently a general belief in Australia, derived no doubt from the data of A. S. Griffith and others obtained in England and Scotland, that tuberculosis of bones and joints, especially in children, is not uncommonly due to the bovine type of bacillus. This is evidently untrue of Australia at the present day; indeed, in this large series there is not a single example of any form of tuberculosis other than glandular in which a bovine bacillus was found. Not only is bovine infection restricted to this form, but its frequency among all cases of tuberculosis in childhood has fallen from 25.9%—as determined by a similar survey made by Webster in 1932—to 8.9% in the present series. The reason for this happy state of affairs is not far to seek. In 1930-1 some 3,000 cattle in ninety herds supplying the Melbourne area were tuberculin-tested, and 7.4% reacted. Since then the number of cows so tested has steadily increased, and in 1939-40 the number was over 28,000 in 727 herds; among these the percentage of reactors was only 2.8. During the same time pasteurization has become more common and more efficient. Webster concludes that tuberculosis of bovine origin is susceptible of total eradication; if progress on recent lines is maintained in the State of Victoria, to which these data mainly relate, this end should be achieved. There are unfortunately no reasons for supposing that any such rapid progress is being made in this country, but the time has perhaps come when a further survey on similar lines to Webster's is needed to reveal the true position. Our data of type distribution are largely those compiled by A. S. Griffith anything up to twenty years or more ago, and it would be interesting to know whether the proportion of bovine infections in different sites and at different ages is still about the same, or whether perhaps the frequency of bovine infection in meningitis and in tuberculosis in bones and joints is diminishing. Methods of cultivating tubercle bacilli have now been so vastly improved that their isolation, and differentiation by cultural characters when this is possible, are within the powers of many laboratories, and there seems to be no reason, except the present shortage of eggs for making the necessary media, why cultivation should not become a routine procedure.

[4] *Radiology*, 1940, **35**, 51.
[5] *Ann. intern. Med.*, 1941, **15**, 276.
[6] *Amer. J. Dis. Child.*, 1940, **60**, 907.
[7] *Med. J. Austral.*, July 19, 1941, p. 49.

ACUTE LARYNGITIS AND H. INFLUENZAE

So much has the influenza bacillus been overshadowed by viruses in the aetiology of epidemic influenza that it is sometimes forgotten that *Haemophilus influenzae*, or at least certain of its strains, really are pathogenic to man. Most of the strains of *H. influenzae* isolated from the nasopharynx possess no capsule, but in 1931 Pittman[1] was able to show that certain strains do have a capsule containing a soluble substance which reacts with the homologous immune serum. On the basis of this reaction six serological types of *H. influenzae* (A to F) have been described. Of the organisms recovered in cases of influenzal meningitis 92 to 95% are said to have been of Type B. Recovery of an organism of this type from sources other than the meninges has been somewhat unusual. Sinclair,[2] however, now describes the isolation of Type B organisms from a series of cases of acute laryngitis associated with bacteriaemia. Altogether there were ten instances in which *H. influenzae* Type B was isolated in cultures of the blood taken from patients desperately ill with acute laryngitis. Special interest attaches to the fact that eight of the cases occurred within a period of fifteen months from January 1, 1940, whereas the other two cases were the only ones observed during the seven preceding years. In three of the cases *H. influenzae* Type B was also isolated from the nose or throat, while in six other patients influenza bacilli were isolated from the nose, but no attempt was made to type the organisms. Incidentally, Alexander and his colleagues[3] have now introduced a method by which these organisms can be identified from the nasopharyngeal mucus within thirty minutes. Acute influenzal laryngitis in children is a very serious disease characterized by a history of severe sore throat, laryngitis, fever up to 104° F., and a leucocytosis in one case up to 44,300 cells per c.mm., the polymorphonuclear leucocytes being greatly increased. Three patients died within eighteen hours of the onset of severe symptoms and a fourth within forty-eight hours. The six cases that recovered all received sulphanilamide, sulphapyridine, or sulphathiazole, but the number was too small for any conclusion to be drawn regarding the relative efficacy of these compounds. The patients who recovered showed little change for forty-eight hours except for the relief of respiratory distress: then improvement was rapid and recovery complete within a week. No influenzal virus could be isolated from these patients. It would seem that this form of laryngitis has in the past been comparatively rare, though the same syndrome, associated with a bacteri-

[1] *J. exp. Med.*, 1931, **53**, 471.
[2] *J. Amer. med. Ass.*, 1941, **117**, 170.
[3] *J. Pediat.*, 1941, **18**, 31.

aemia due to *H. influenzae*, was described in France in 1936 by Le Meirre, Meyer, and Laplane.[4] Now that attention has been drawn to it acute influenzal laryngitis may prove to be more common than was supposed.

HEPARIN IN CAVERNOUS SINUS THROMBOSIS

Cases of thrombosis of the cavernous sinus may be divided into two groups—a posterior otogenic group in which the thrombosis extends into the cavernous sinus from the petrosal sinuses, infection thus reaching its posterior end; and an anterior group in which the primary focus is situated in the accessory sinuses, the eye, or the skin of the face, the infection reaching the cavernous sinus at its anterior extremity. In the first group the infection is almost invariably streptococcal; in the second it may be streptococcal, but if it arises in a furuncle on the nose or lip it is likely to be caused by the *Staphylococcus aureus*. Although there are reports of a few recoveries, in which it may be assumed that the clot in the cavernous sinus itself remained aseptic, in general the prognosis is almost hopeless. Surgical treatment has proved of little avail, whether the cavernous sinus be approached from behind by the temporal route for reaching the Gasserian ganglion in the aural cases, or by the orbit in the anterior group.[5] Eagleton[6] planned to put the cavernous sinus at rest by ligature of the internal carotid, but he soon abandoned this as no good came of it, and until the introduction of the sulphonamide drugs no further progress was made. The posterior otogenic type, which sometimes progresses with fulminating rapidity, is rare. It is in the less uncommon anterior type originating in a staphylococcal infection of the skin that two helpful observations have now been reported by Champ Lyons.[7] It is necessary not only to control the blood infection by chemotherapy, for which sulphathiazole is required as these infections are staphylococcal, but also to prevent extension of the thrombosis, for which purpose heparin is now available. By using these two remedies Hoople and Blaisdell[8] have been able to report a case of recovery in a woman of 22, a previous case in a boy of 14 treated only by sulphathiazole having ended fatally in nine days. Le Roy Schall[9] also records details of three staphylococcal cases (of which two were those in the care of Champ Lyons) which recovered on this plan of treatment.

Bacteriological examination is essential in order that the appropriate drug may be used with certainty, and the heparin is administered by a continuous intravenous saline drip. To each 100 c.cm. of saline solution 1,000 units of heparin—i.e., 10 mg.—is added. This solution is allowed to run into the vein at such a rate that the clotting time of the blood is maintained at about ninety minutes. Should it be necessary to resort to some surgical intervention to evacuate an abscess, the heparin would have to be stopped. The coagulation time of the blood returns to normal in about four hours, so that the indications for stopping or continuing the administration of heparin in relation to operation are fairly evident. In one of the reported cases the heparin was administered for seventeen days, and in another for nine days. The total dosage may amount to 225,000 units. The heparin cannot be expected to exercise any influence upon a clot already formed, but it appears to be capable of preventing any further extension, and the results are certainly encouraging in the commoner type of cavernous sinus thrombosis.

[4] *Ann. Méd.*, 1936, **39**, 97.
[5] *British Medical Journal*, 1922, **2**, 460.
[6] *Cavernous Sinus Thrombophlebitis*. By W. P. Eagleton. New York: Macmillan, 1926, p. 127.
[7] *Ann. Surg.*, 1941, **113**, 113.
[8] *Ann. Otol.*, 1941, **50**, 503.
[9] *J. Amer. med. Ass.*, 1941, **117**, 581.

BRADYCARDIA IN JUVENILE RHEUMATISM

It is commonly accepted that tachycardia is the usual indication of cardiac involvement in juvenile rheumatism, but according to A. J. Glazebrook and S. Thomson[1] slowing of the pulse rate is a common feature of the first attack of rheumatic infection in adolescents and young men. They record observations on the pulse rate in a hundred consecutive cases of acute rheumatism in boys and youths aged from 15 to 20 years. These cases fall into three groups. In one the pulse rate was commensurate with the temperature—that is, an increase of 10 beats a minute for every degree Fahrenheit. In the second group there was some increase in the pulse rate but not to a degree commensurate with the rise in temperature, and in the third there was no quickening but a slowing of the pulse rate, which fell below the normal rate for the individual irrespective of any pyrexia. There were thirty-eight cases in the first group, thirty-two in the second, and thirty in the third. Histories showed that bradycardia was more common in those suffering from their first attack of rheumatism, and of the thirty cases in the third group the bradycardia occurred early in the illness, usually within the first four days. (The cases were observed in a large institution, and it is probable that the records of the pulse rate were kept at an earlier stage of the disease than would happen in ordinary hospital practice.) In some cases the slowing of the pulse was transient, lasting only two days in one instance. Treatment did not appear to affect the appearance of bradycardia. Salicylates in moderate and in massive doses, antistreptococcal serum, and special immune serum were among the methods used; bradycardia occurred in patients treated by any one of these methods and was also seen in control cases given no specific treatment. Saturation with vitamin C and with vitamin B was also employed in some cases, but there was still bradycardia. A slow pulse was found in every degree of severity of the disease, but in the early stages of rheumatic infection such slowing seemed to be of serious prognostic significance as regards permanent cardiac damage. Half of the patients with bradycardia developed permanent damage of the heart compared with 30% of the rest of the patients observed. Electrocardiography gave evidence of heart-block in three patients only. In the majority of the group examined there was a simple sinus bradycardia, with some prolongation of the P-R interval. An exaggerated degree of sinus arrhythmia was often found. It is held that these findings suggest the existence of vagal over-stimulation, brought about by the action of the rheumatic toxins on vagal nerve terminations. Hence Glazebrook and Thomson have come to regard slowing of the pulse in juvenile rheumatism as an index of the severity of the toxaemia, believing that it is essentially due to the action of streptococcal endotoxins.

The King has approved the award of a Royal Medal of the Royal Society to Prof. E. L. Kennaway, M.D., F.R.S., director of the Chester Beatty Research Institute of the Royal Cancer Hospital, for investigations on the production of cancer by synthetic substances. The President and Council of the Royal Society have awarded the Copley Medal to Sir Thomas Lewis, M.D., F.R.S., for his experimental researches on the heart and the circulation and their disorders; and the Davy Medal to Dr. H. D. Dakin, F.R.S., for his pioneer work in biochemical research, and especially for fundamental contributions to the study of intermediate metabolism.

[1] *Edinb. med. J.*, 1941, **48**, 619.

NETWORK PLAN FOR DEALING WITH INVASION CASUALTIES

BY

GORDON WARD, M.D.

This simple plan depends upon a few facts which can hardly be disputed. First, we cannot know until air and sea invasion starts what parts of the country will be most severely engaged with the enemy. Secondly, in most of these parts collection of the wounded by means of ambulances will be impossible for a period which high authority estimates as from one to seven days. Thirdly, even if the collection of wounded is possible it may often be undesirable because the nearest hospital is threatened or already destroyed. Fourthly, in these isolated areas, cut off from other means of medical assistance, casualties will have to be retained and treated near to where they occur, and with such facilities as may be there available.

These new facts almost compel the adoption of a scheme by which the country shall be covered with a network of aid-posts, which should be approximately one mile apart. In many moorland and forest areas the mesh will obviously be wider. In towns it may be considerably closer because town communications are so easy to obstruct. The exact size of the mesh does not matter at the moment. It will vary. But the one-mile mesh is chosen as ideal because the wounded will have to be carried in on stretchers, and even half a mile is a very long way to carry a heavy man or woman.

Those whom the Plan will Benefit

Before considering the nature of this network plan let us say something about the people for whose benefit it is designed. It is clear enough that local residents will benefit from the posts near to them. But they are not the only ones to be thought of. Everyone knows that our coast towns are nearly empty, and that they have not enough inhabitants to deal with hundreds of fires in empty houses. If the enemy sees fit, these towns will burn, and the remaining inhabitants will spread out into adjacent countryside. What else can they do? The network plan will ensure that these people are not left without medical help. Then again, there are thousands of troops who will be carried towards the enemy in motor vehicles. They cannot escape air attack and wounding. What is to happen to these casualties? Shall the tank stop to look for a doctor? The plainly marked posts of the network plan will go far to solve this difficulty. We dare not leave our wounded to die by the roadside or to lie forgotten in a cottage while it is in our power to arrange something better.

Composition of the Network

Now we can turn to the composition of the network. Much of it is already in place, some of it recognized, some still unrealized. In the towns there are hospitals, aid-posts with large trained staffs, and many excellent first-aid units connected with factories and works, railways, and so forth. It remains only to see that each has its place and is plainly indicated to the passer-by by a uniform sign. Then we must add any more that seem necessary. It must always be remembered that street fighting and the destruction of the larger aid-posts may wreck the town organization if reliance is placed on too few centres for medical aid. In the country things are not so good. There are only a few aid-posts and a very few up-graded first-aid points which could keep casualties for seven days. To these we should add certain units whose usefulness is often overlooked. In time of invasion the empty wards and idle staff of isolation hospitals must not be wasted. All asylums can deal with wounded, and most public assistance institutions and many sick-bays used for evacuees: these must all be roped in. There are also thousands of military aid-posts which will be available. All of these must be carefully entered upon a map in every county or rural district. Then the Home Guard casualty collecting posts, those of them which can keep casualties for seven days, must be added. Only then will it be possible to see what new posts must be provided to make the network complete. I think the best people to set up these posts may be the members of those local invasion committees which are making such a success of all-in co-operation in East Anglia.

Supplementary Posts

Now as to the nature of these posts—that is, of the additional posts still required to make the network complete. They must be able to retain the wounded up to seven days; that is essential. They won't be able to provide major surgery or anything like that, at least in most cases. Very few will have a resident doctor. Even if all services combined, which they are not doing at present, it would not be possible to provide a doctor at every post, but by careful organization beforehand it should be possible to arrange that every five or six posts will come under the care of one doctor, who will attend where and when he is needed. He will probably have to walk and visit at night, but night visits are nothing new. In every post it should be easy to provide someone with first-aid and nursing experience. It will also be possible to provide those extremely important things—rest, warmth, and food, dressings, and morphine. These are not little things; they are far more important to the wounded than the services of a surgeon. In any case, if we do not provide them many of our wounded will have nothing at all except such things as may be found in a house chosen at hazard and utterly unprepared. We must have either ambulances or the network plan, and if the ambulances are not possible, as will happen in isolated cases, we must have the network completed as soon as possible.

Policy of Dispersal

Lastly, let us discuss one or two objections which have been raised. The first of these is the suggestion that this plan is something which a self-important individual (myself) has set up to compete with the A.R.P. services. Surely only wilful prejudice or insufficient knowledge of the network plan could prompt this view. The plan is a normal and logical extension of the A.R.P. services. The second objection sounds at first more plausible. It is that the network plan will dissipate both staff and medical supplies urgently needed at town centres. The obvious answer is that if invasion is going to dissipate and disperse casualties, and keep them dispersed, then we must disperse whatever is needed to deal with them. In isolated areas the policy of dispersal will be fully justified. In other areas both stores and personnel can be recalled if needed; but since our hospitals all carry upwards of one whole year's supply of dressings in reserve, the policy of the network plan does not really threaten them very seriously. And there is another point. These big hospital stores are all in places which are exceedingly vulnerable. The Nazi airmen cannot destroy every house in the country, but they could very easily destroy these big stores in the towns. Food and ammunition are dispersed; it is high time that medical stores were also dispersed, even if only for safety.

One last point. Army and civilian morale depend very largely upon the belief that casualties will be dealt with wherever they occur. At the moment this belief is a delusion. It is helping Hitler if we leave the wounded to die by the roadside, or throw them into the nearest house to be attended by anyone who chances to be there. That is what will happen if we do not take steps in time. It is quite easy to do better, and we ought to do it. I sincerely believe that the network plan is an anti-invasion measure of the very greatest importance for the maintenance of morale as well as for the assistance of soldiers and civilians.

F. A. H. Simmonds (*Tubercle*, 1941, **22**, 183), who records his observations on 250 cases, states that effusions in artificial pneumothorax are less common if the lung is adequately freed by sections of adhesions. When effusions occur they are most common within three months of the operation. When valvular pneumothorax occurs the valve is in the bronchus connected with the cavity, where a more or less localized caseous bronchitis is present. Effusion is commonly preceded by signs of spontaneous pneumothorax.

SHAMMING NIGHT-BLINDNESS

BY

N. BISHOP HARMAN, M.B., F.R.C.S.

Eye tests are of two orders: objective and subjective. We can examine the eye in all its parts with our ophthalmoscopes and other instruments and watch certain reactions to light which are uncontrollable by the mind of the subject. But what the detailed vision of that eye may be we cannot find out except by the voluntary response of the subject. There are occasions when the objective findings and the subjective responses seem to clash. The eyes of a subject on examination may appear quite good in every detail, yet the visual response may be poor. The possibility of checking the visual response by special tests is a problem of interest and present-day importance; it is particularly so as regards seeing in a minimum of light—night vision.

The publication (*Journal*, September 6, p. 349) of the results of the examination of 700 subjects for night-vision reactions with the disk-spotting test has brought inquiries as to the possibility of using the test to distinguish between a real defect of night vision and a suspected shamming. To-day there are many branches of national service that require the citizen, whether a civilian or a member of the Services, to do work that entails ability to see in the dark. Inability to do so means not only danger to the subject but also danger to the community if that subject be truly night-blind or partly so. Is this inability always real or may it be sometimes false? How are we eye men to find out?

Shamming Bad Day Vision

Something of the same problem arose on occasions during the last war in the examination of men called up for military service. The eyes of a subject under detailed examination were found to be good, but the visual reaction was poor. Then I devised a test which enabled the examiner to check the visual reaction in some measure. This test has since been of much value in examining patients claiming workmen's compensation for eye injury whose visual reaction was much worse than the state of the eye seemed to warrant. The test is as follows:

Two Snellen's test types are fixed one on each surface of the same board. On one side the regular range from 6/60 to 6/6 is fitted. On the other side the types range from 6/36 to 6/5, but the arrangement of these slightly smaller types matches in pattern and in general appearance the normal set of types. The patient is shown No. 1 test type; say he reads three lines: V=6/24. Now No. 2 test type is exposed; if he again reads three lines his vision is really 6/18, and he is convicted of inconsistency and suspected of shamming deficiency. The test is easy to apply and has proved to be very useful.

Shamming Bad Night Vision

Checking suspected shamming of bad night vision is a much more difficult problem. If there is found in the eyes of the subject density or opacity of the media, or very small pupils that do not dilate, or defect of the fundus oculi, then the deficiency is likely to be genuine. High errors of refraction and the need for thick lenses will also make it genuine. But in some cases there is good daylight vision, no discernible sign of defect on the objective examination of the eyes, and no general defect of health or nourishment to explain the poor night vision reaction. There may be as complete an absence of any ocular evidence in confirmation of the night vision defect as there is of anomalies or lack of colour vision.

By applying the experience with the daylight test described above it is possible so to vary the use of the disk-spotting test as to make it a check upon the reaction of the subject. This can be done in two ways: (1) varying the light; (2) altering the size of the disks on the test.

1. *Varying the Light.*—The candle-box enclosing the standard candle has a projection tube through which the light passes to the white disks on the test board. A cap, like a pill-box lid, can be made with its flat surface of semi-transparent grease-proof paper; the density of this film can be chosen so that it cuts off half the candle-light. Or the light may be increased instead of diminished: if a hand torch with a sliding or adjustable reflector be held alongside the candle-box the adjustment can be made so that the torch light reinforces the candle-light and increases it three or four times.

2. *Altered Disk Sizes.*—The size of the disks in the test board can be changed. The normal-pattern disks are 1/2 inch in diameter and 1/8 inch in separation from each other. In the test board (as made by Theodore Hamblin, Ltd.) there is space enough on the velvet surface of the base board between disk-groups 4 and 5 to allow to be pasted to it another set of disks, four in number, each of 3/4 inch in diameter, and separated by 1/4 inch. Thus the size and distinction of the disks in the candle-light can be suddenly altered by turning the test cover during the examination.

There are then three ways in which the test may be made more difficult or more easy. If the subject with bad night vision is genuine in his disability he will show this in his response to the variation of the test. When the light is less his vision will be worse; when the light is brighter he will see much better and at a greater distance. So also will he see somewhat better when he is shown the larger disks. For example, a subject whose response to the regular test was only 2.5 metres was tested this way. (The average response of normal subjects is at 5 metres.) After a full dark adaptation the varied tests were made. He could only count the disks in the reduced light at 1 metre; he could count them easily at 6 metres with the added light; he could count the larger disks in the usual fractional candle-light at 3.25 metres. There was thus reasonable consistency in the reactions of this subject to light variations, so the night-vision defect was considered to be real. In making these variations of the test in suspected cases it is desirable to have an assistant to help the examiner manipulate the test. The examiner should stand with the subject. Between each grade or alteration of the test the eyes of the subject should be covered, so that there will be no actual observation of the changing of the conditions of the test.

Conclusion

Applying tests to check subjective vision reactions requires much nous on the part of the examiner. It is a trial of wit against wit. The "cutest" one of the pair, examiner and examinee, will win the trial, but that is the normal reaction of a medical practitioner: he is always faced with problems in diagnosis and the interpretation of symptoms that demand acuteness of judgment.

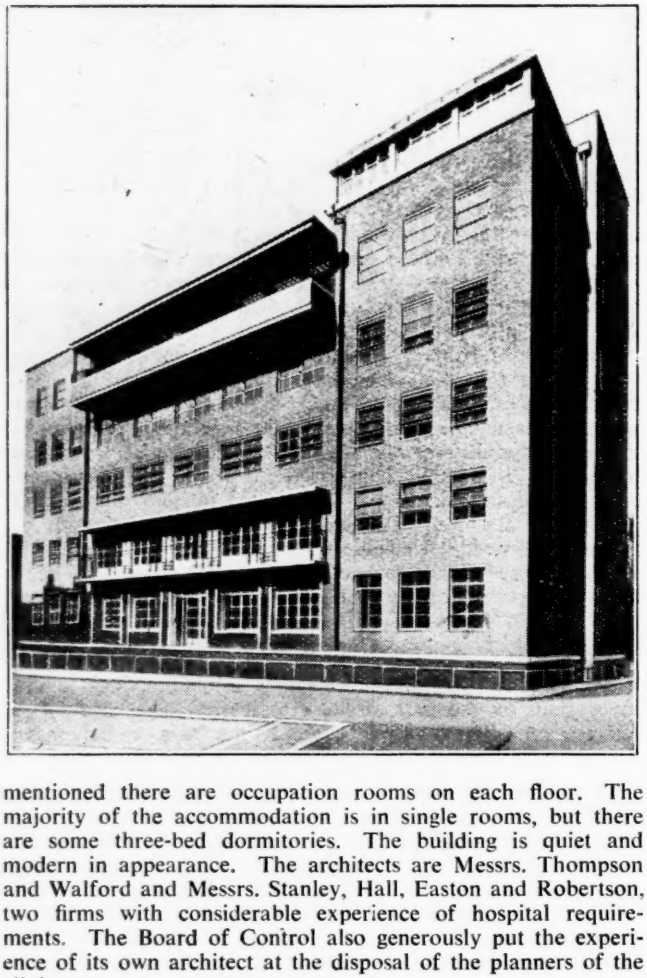
THE YORK CLINIC AT GUY'S HOSPITAL

The building has recently been completed at Guy's Hospital of the York Clinic—the first psychiatric clinic to be erected in this country as part of a general teaching hospital. Its opening will have to be deferred until the end of the war, but its completion at this time is symbolic of a determination that when the conflict is over social and scientific progress will go forward hand in hand at an increased speed.

For fifty years Guy's Hospital has had a lecturer in psychological medicine, and more than 200 years ago its founder provided in his will for the care of forty chronically insane patients in a ward which stood in the hospital precincts. Later the Governors obtained the permission of the Charity Commissioners to transfer the funds available for this purpose to Bethlem Hospital. In accord with the developments of medical, and especially of psychiatric, science that have taken place since these old days the new clinic is intended to fulfil a very different purpose. "Functional" disorders, or psychoneuroses, have been found to result from disturbed minds, and the general need for early treatment of mental disorders has been stressed. The York Clinic has been constructed for the treatment both of psychoneuroses severe enough to require in-patient treatment and of psychoses. The purpose of having it within the precincts of a general hospital is twofold: first, to encourage the early treatment of all such conditions as can be admitted with no other formality than attends the admission of any other type

of case to a general hospital; secondly, to facilitate and intensify the teaching of psychological medicine in all its aspects, both as a social and as a medical science.

The building contains forty-two beds and has five floors, the ground floor being devoted to public rooms and offices, the basement to a laboratory, gymnasium, dining-room, etc., and the roof to recreation space. Those who planned the clinic have aimed to make it, within the limits available, a place where the patients can live without being confined to bed. For this reason there is the maximum amount of day space that it was possible to provide. The corridors are especially wide and can be used as lounges, and besides the public rooms already



mentioned there are occupation rooms on each floor. The majority of the accommodation is in single rooms, but there are some three-bed dormitories. The building is quiet and modern in appearance. The architects are Messrs. Thompson and Walford and Messrs. Stanley, Hall, Easton and Robertson, two firms with considerable experience of hospital requirements. The Board of Control also generously put the experience of its own architect at the disposal of the planners of the clinic.

Those who provided the money to build the clinic have allowed sufficient funds for a capital sum, with part of which it is hoped to provide some free beds; but for some time to come it will be necessary for the majority of patients to be charged fees which will meet a variety of needs.

For teaching purposes the clinic will work in close association with the out-patient department and with the existing half-dozen psychiatric beds provided by the Governors during the last decade. The increased contacts between the staff of other departments and the department for psychological medicine should have the desirable effect of bringing psychiatry still closer both to general medicine and to the other specialized branches.

B. G. Hoo (*Acta paediatr.*, 1941, **28**, 293) records a fatal case of congenital malaria with congenital heart disease in a child. The mother had her first attack of malaria one day after the child's birth. Malarial plasmodia were found in the child's blood on the twentieth day of life. During the period when parasites were found in its blood the child had no fever and there was no enlargement of the spleen. Only later was there a slight rise of temperature.

MEDICAL WAR RELIEF FUND

THE FIRST YEAR'S WORK

The following report on the work of the Medical War Relief Fund during the first year of its existence has been approved for publication by the Committee of the Fund.

In September, 1940, the Medical War Relief Fund was inaugurated to provide temporary assistance for British medical practitioners and their dependants who find themselves in financial straits as a direct result of war conditions. At the end of that month the first appeal for subscriptions was published in the medical press. The response, from both individual practitioners and medical organizations, has been most encouraging, and by the end of September, 1941, the contributions to the Fund had reached the total of approximately £34,000. To all who have subscribed so generously the Committee of the Fund wishes to express sincere thanks. It will not be considered invidious to refer in particular to the splendid help received from medical practitioners over-seas who have not forgotten the needs of their colleagues in the Home Country. A cable has recently been received from the British Medical Association in Australia intimating a donation of £4,500 (Australian) contributed by members in that country. This is additional to the total of £34,000 already received. The Malaya Branch of the B.M.A. has contributed more than £300, and a first contribution from the Canadian Medical Association, consisting entirely of subscriptions collected from doctors in British Columbia, amounts to nearly £350. Other generous donations have been received from organizations in Australia, Canada, Hong Kong, and Uganda, as well as from individual practitioners in various parts of the Empire.

Classification of Applicants

The first awards were made by the Distribution Subcommittee on November 13, 1940, and between this date and September 30, 1941, forty-four applicants received assistance, the approximate average being one a week. These forty-four cases do not readily lend themselves to any simple method of classification, for the financial difficulty which led to the application was frequently due to more than one cause. In five cases the beneficiaries are dependants of doctors killed on active service with the Forces, and an equal number of awards have been made in cases of doctors killed—or, in one case, disabled—by enemy action while engaged in civil defence duties or ordinary civil practice. The largest group, numbering sixteen, is made up of doctors whose difficulties were primarily attributable to the bombing of their homes or consulting rooms, with destruction of or damage to their cars, furniture, instruments, or other possessions. Assistance was given in seven cases to men who were temporarily in difficulty owing to loss of patients through evacuation, and in eight cases to medical officers and ex-officers who were in financial straits owing to reduction of income as a result of joining the Services, or required help in re-establishing themselves in their practices after relinquishing their commissions on the ground of ill-health. There remain three miscellaneous awards, one of which was made to the wife of a doctor who continued his work in one of the Channel Islands at the time of the German occupation and is therefore temporarily unable to support his family in England.

Form and Amount of Assistance

Some of the applicants responded to the invitation to state the amount of the gift or loan which they found it necessary to request; others preferred to leave the form and extent of the assistance needed to the judgment of the Distribution Subcommittee. When definite requests have been made the full sum asked for has not always been given. On the other hand, there have been cases in which the amount awarded has been in excess of the evidently too modest demand. The aim has been to provide, so far as possible, a real solution of the immediate problem and to remove the attendant anxiety by giving promptly such assistance as medical practitioners would wish to see rendered to their stricken professional colleagues. Care has been taken to avoid not only parsimony but also too lavish generosity; for the Subcommittee has been mindful of the future

and the probability that many more applications will be received before the war is over. As is stated above, only five applications have hitherto been received from dependants of doctors killed on service with the Forces, but as our armies become more actively engaged more casualties must be expected, with a consequent rise in the number of dependants left in difficult circumstances. It must also be assumed that as men are released from the Services many of them will need temporary financial help in the difficult task of resuming their practices. But apart from such cases as these, there can be little doubt that as the war goes on and economic difficulties become greater the number of applications for assistance will steadily increase.

Grants to widows and other dependants have inevitably taken the form of gifts, and in a considerable number of other cases this appeared to be the only appropriate method of help. Applicants whose financial problems seemed likely to be merely temporary requested and received loans, but in some of these cases it was thought desirable to give part of the sum required as a gift, particularly when it was essential to replace professional equipment and other possessions at a cost in excess of the amount of war damage compensation likely to be paid. Twenty-eight applicants have received gifts amounting to £3,420; seven have received loans totalling £1,690; and nine have received both gifts (£1,375) and loans (£1,350) amounting in the aggregate to £2,725. The total of the gifts is £4,795 and of the loans £3,040, the grand total up to September 30, 1941, being £7,835. One loan of £200 has already been repaid in full, and another is being repaid in regular monthly instalments.

Co-operation with Other Bodies

The Distribution Subcommittee has worked in the closest co-operation with the Royal Medical Benevolent Fund, which is strongly represented on the Subcommittee. In two ways the assistance of this organization has proved of particular value. First, there have been cases in which widows with young children have been voted considerable sums towards educational and other expenses over a period of years. In such cases the R.M.B.F. has been good enough to accept the responsibility of administering the awards, and has been given discretion to vary the instalments according to the needs of the families concerned from time to time. This fortunate arrangement ensures for these families the maintenance of a friendly interest in their welfare throughout the difficult years immediately ahead, and the continued availability of advice and assistance should such be required in the more distant future. Secondly, the experience of the R.M.B.F. has been of great assistance in obtaining supplementary grants from other organizations, and especially in securing pensions for widows whose need of regular help may well continue beyond the time when the Medical War Relief Fund will cease to exist. Of the forty-four applicants who received awards from the Fund, no fewer than eleven have been introduced with successful results to various benevolent societies, including the R.M.B.F. itself.

The Committee deeply appreciates the hospitality shown by the British Medical Association in providing accommodation for its meetings and those of the Subcommittee, and the assistance voluntarily given by the secretarial, accountancy, and clerical staff of the Association in connexion with various aspects of the work of the Fund. The Committee wishes to acknowledge also the help received from the secretary of the Subcommittee, Mr. E. C. Pennefather. His wide experience with the Royal Medical Benevolent Fund and his knowledge of other charitable institutions have been of great value. Thanks to the generous co-operation given by the B.M.A. and the R.M.B.F. the administrative expenses during the first year, including the cost of printing, stationery, application forms, etc., and the cost of postages in connexion with appeals and the acknowledgment of subscriptions, amount only to approximately £150—2% of the amount expended in awards and less than 0.5% of the total amount contributed.

The address of the Honorary Treasurer and the Honorary Secretary of the Fund is B.M.A. House, Tavistock Square, London, W.C.1. A statement explaining the constitution of the Fund and containing brief accounts of six typical cases was published in the *Journal* of April 12 last (p. 566). Additional cases are summarized below.

Illustrative Cases

Dr. G., a senior general practitioner, lost his life in a raid in which his house was completely destroyed. His only child was killed at the same time. The widow lost her clothing and other possessions, and although the doctor's estate would eventually furnish her with a modest income she was temporarily without means. She was awarded a suitable sum as a gift to provide for her immediate needs.

Dr. H., another general practitioner, had invested his savings in a small practice, which he purchased in the early part of 1940. A year later he was killed by enemy action. There was little left for the widow, who was also a casualty, but it seemed that she would be capable of earning her livelihood when she had recovered from her injuries. She was awarded a grant which she has gratefully described as a "magnificent gift." She has now found suitable employment.

Dr. I. is one of the many specialists whose incomes have been seriously affected by certain restrictions imposed by emergency legislation. In addition, Dr. I. has been "bombed out" repeatedly, and has had the misfortune to see the company in which his savings were invested become bankrupt as a result of war conditions. Despite economies, both domestic and educational, and a tendency to improvement in his greatly reduced practice, he found himself unable to meet a number of pressing debts. The amount required was provided by the Fund, one half of the sum being awarded as a gift and the other half as a loan. Dr. I. has expressed his profound gratitude and his intention to repay the loan as soon as possible. "With any reasonable luck," he writes, "I should now be able to hold out here until the war is over."

Dr. K. is an elderly consultant. His consulting rooms were bombed and completely destroyed with the furniture, instruments, and books which they contained. The income from his practice had diminished considerably owing to the war, and although he had no debts of any magnitude, neither had he the means to acquire new premises and equipment while awaiting the payment of war damage compensation. He was awarded a substantial sum for this purpose—the greater part as a loan and the remainder as a gift. He writes: "It just feels as if I had emerged from the black-out into brilliant sunshine. The feeling of relief is intense. Will you please express my great gratitude to the Committee for the chance of a fresh start." my great gratitude to the Committee for the chance of a fresh start."

Dr. L. was a comparatively young man who combined general practice with a part-time public health appointment. He had had little time or opportunity to save, and when he died of wounds on active service with the R.A.M.C. his indebtedness to an insurance company was greater than the amount that could be realized by the sale of his practice. Mrs. L., who has young children, will receive a small pension from the Army, and she hopes to place the children in boarding schools in order that she may be free to take up remunerative employment. To assist in the education of the children the Fund has awarded her a gift which will be administered over a period of years by the Royal Medical Benevolent Fund; and Mrs. L. has been introduced to another society, which has promised an additional grant for educational purposes.

Dr. M., a specialist serving in the R.A.M.C., was killed on active service, leaving a widow and child. Mrs. M. has been awarded a gift (to be administered by the Royal Medical Benevolent Fund) which will suitably supplement her small income during the child's remaining years at school. As Dr. M.'s elderly mother had been partially dependent on him a similar arrangement has been made in her case; and Mrs. M. senior has been introduced to two other benevolent societies, one of which has awarded her a small grant, while the other has given more permanent assistance in the form of a small pension.

The Federation of American Societies for Experimental Biology announces that in March, 1942, it will issue the first number of a quarterly publication to be named the *Federation Proceedings*. This will be published by an editorial board representing the five constituent societies of the Federation: the American Physiological Society, the American Society of Biological Chemists, the American Society for Pharmacology and Experimental Therapeutics, the American Society for Experimental Pathology, and the American Institute of Nutrition. Four numbers of the new periodical will appear each year. Abstracts of the papers will be grouped under the societies to which they are communicated and will be indexed according to subjects and authors. The subscription price to non-members is $4.00 ($4.50 foreign), payable in advance, on application to Dr. D. R. Hooker, managing editor, 19, West Chase Street, Baltimore, Maryland, U.S.A.

A PATHOLOGICAL WAR COLLECTION

We publish below a statement issued by the War Wounds Committee of the Medical Research Council on the collection of pathological specimens illustrating the injuries and diseases of war.

The Army medical war collection of museum specimens made between 1914 and 1918 and housed at the Royal College of Surgeons, London, has been destroyed, and no organized effort has hitherto been made to replace it, nor have steps been taken on any large scale to conserve specimens illustrating the injuries sustained in the present war.

The Medical Research Council have accepted a request from the War Office and the Royal College of Surgeons of England that they should assist with arrangements for forming a comprehensive National Collection on these lines, and a special subcommittee of the War Wounds Committee has been appointed to consider means of making the scheme effective. This subcommittee includes nominees of the three Fighting Services, the Ministry of Health, the Department of Health for Scotland, the Royal College of Physicians of London, and the Royal College of Surgeons of England, and it is hoped to secure the co-operation of the whole profession in regard to the collection of suitable material. It is proposed that the collection should include specimens, pictures, photographs, and skiagrams which illustrate the lesions produced by missiles, war gas or explosion gas, secondary missiles such as fragments of masonry or debris, crushing injuries, the effects of impact of the blast wave in air or water produced by high-explosive detonation, and burns resulting from any of the above causes. Material illustrating the mode of repair, the consequences of infection, and the results of treatment of war wounds and injuries should also be included. It is considered desirable that specimens should, in the first place, be sent to one of two receiving depots, where they would be classified and temporarily stored. The depot for Scotland and the North is to be the Pathological Department, University of Leeds, and specimens should be addressed to Prof. M. J. Stewart, M.B., F.R.C.P., at that address. The depot for the South is to be at Hill End Hospital, St. Albans, Herts, and specimens should be addressed there to Prof. G. Hadfield, M.D., F.R.C.P.

The value of any pathological specimen when mounted depends very largely upon a discerning choice of material, upon the care taken in collection, and upon the preliminary treatment applied. Some general instructions regarding preliminary treatment are given below:

Selection and Preliminary Treatment of Specimens

1. Only those specimens should be chosen in which the lesions can be clearly displayed—that is, typically demonstrative specimens.

2. The collector should take every care to maintain the shape and form of the specimen during fixation, when the greatest amount of shrinkage and distortion is liable to take place. A hollow viscus or any tubular structure should be suitably packed with absorbent cotton-wool soaked in formol saline before the specimen is immersed in the fixative. Structures such as nerves, arteries, segments of bowel, or slices of solid organs should be fixed in position on a suitable frame to prevent shrinkage, bending, or distortion.

3. Fixation should be carried out in a convenient receptacle such as a bucket (only if enamelled or tinned), a basin, or a jar; the volume of the receptacle should be at least twice and preferably three times that of the specimen. This ensures that the greater part of the weight of the specimen is supported by the fluid, but cotton-wool should be placed at the bottom of the receptacle to prevent flattening. Bottles with relatively narrow necks, through which specimens would need to be forced, should be avoided. The receptacle should be covered with a lid, but need not necessarily be tightly corked.

4. The fixative used should be 4% formol saline. Stronger solutions do not give better fixation and tend to inhibit penetration of the tissues. In the case of solid-organs, with the exception of the brain, the fixative never penetrates more than about a quarter of an inch. For this reason all dissection and trimming should be carried out before fixation is completed. The fixative is made up as follows: Sodium chloride, 9 grammes; commercial formalin (40% formaldehyde), 100 c.cm.; water, 1,000 c.cm. Formalin solutions have a strong tendency to become acid by oxidation to formic acid, and it is of the utmost importance that any acid formed should be neutralized. This can be done by adding a small quantity of carbonate of magnesia (mag. carb. pond.), chalk, or marble chips to the stock solution, which should be stirred occasionally. The clear neutralized fluid for fixation can then be decanted as required

5. The specimen should remain in the fixative until it is sufficiently hardened for safe dispatch by post to the receiving depot, where fixation will be completed if necessary. The time required varies considerably with the nature of the specimen. Small, delicate specimens will be adequately fixed in a few hours, whereas larger, fatty specimens may require a week for fixation. Since glycerin and other mounting fluids are now almost unobtainable, no large-scale attempt will be made at present to restore the colour of specimens. The specimens will be stored in separate containers to prevent crushing and distortion, and they will be mounted when supplies of mounting fluids are available.

6. For dispatch by post a specimen should be taken out of the fixative, drained of excess fluid, wrapped in lint moistened in fixative, and covered with jaconet. The parcel should then be packed in dry wood wool or sawdust, in a suitable box. The dry packing should be sufficient to prevent leakage during transit, and the box should be clearly labelled "Pathological Specimen." It is essential that a precise history should be sent with each specimen, giving the cause of the injury, treatment, and clinical progress, and emphasizing any pathological point that the collector regarded as important. The name and age of the casualty, the hospital concerned, and the name of the collector should be stated. The history may be sent by separate post, or in the box with the specimen, provided that the papers be prevented from damage by moisture. An acknowledgment of receipt, together with any comments needed on the condition of the specimen on arrival, will be sent to the collector.

CZECHOSLOVAK MEDICAL RECEPTION

A reception for English doctors was held by the Czechoslovak Medical Association in Great Britain at the Czechoslovak Institute in Grosvenor Place, London, on November 11, under the patronage of Mr. Frantisek Nemec, Czechoslovak Minister of Social Welfare. The members of the committee were Mr. R. H. Bruce Lockhart, Dr. K. Machacek, and Prof. J. Löwy, M.D. The large attendance of Czechoslovak medical men and women included officers serving in the Czechoslovak Army, the R.A.M.C., and the British Merchant Service. Leading members of the profession and representatives of the A.M.S. and R.A.M.C. were among the guests.

After Mr. P. B. B. Nichols, H.B.M.'s Minister to the Czechoslovak Government in Britain, had opened the proceedings, and the Chairman of the British Council had spoken, Prof Löwy, who was a student at St. Bartholomew's some thirty years ago, and for many years a representative of his country at the Committee of Industrial Hygiene at Geneva, delivered a speech in remarkably fluent English, expressing the gratitude of the Czechoslovak doctors for permission to practise in Great Britain. The professor deplored the deterioration of medical education in Germany from the high standard existing until 1933. In a felicitous reply Mr. H. S. Souttar, speaking as Chairman of Council of the British Medical Association, warmly welcomed the Czechoslovak doctors to this country, at the same time expressing an optimistic opinion about the progress of the war. He pointed out that mankind is indebted to Czechoslovakia for radium, first extracted from uranium ore in the Jachymov mines in Sudetenland.

Copies of the *Bulletin of the Czechoslovak Medical Association in Great Britain* were distributed to the guests, describing the activities of this organization, and also health services, social insurance, and kindred matters in the Czechoslovak Republic. For the first number of this publication Lord Horder has written a foreword.

Later the reception continued in a pleasantly informal manner, and the friendliest contacts were made between members of the profession in both countries. A strong natural affinity was apparent, as has often been remarked by those who visited Czechoslovakia in happier times.

Reports of Societies

RECONSTRUCTION IN PSYCHIATRY

The presidential address in the Section of Psychiatry of the Royal Society of Medicine was delivered at the first meeting of the winter session by Dr. A. A. W. PETRIE, who dealt exhaustively with the place of psychiatry in the general medical reconstruction which will follow the war.

He recommended the creation of mental health services throughout the country, embracing areas large enough to provide every facility; the separation of all potentially recoverable mental patients from the chronic; and an effort to reduce the segregation problem by the resocialization, with safeguards, of all possible mental and mentally defective persons. As a preliminary measure he suggested the voluntary sterilization of all markedly neurotic or psychotic patients who desired it. He also suggested improved facilities in the education of the medical student, and a fusion of the varied interests in psychiatry, so that all elements might benefit by approximately a common training, and an important body of opinion might be formed which would direct and guide the mental health of the whole country.

Mental Health Services

Dr. Petrie, in discussing the first part of his subject, the basis of the mental health services of the country, said he thought that fusion or partial fusion of general and mental health services in municipalities was inevitable. Such fusion would largely solve the question of the development of observation wards into something nearer to the "acute" psychiatric hospitals familiar in Germany and America. Mental health committees should be formed or reconstituted by public authorities with the function of furthering mental health and only incidentally dealing with segregation, which represented the failure of such a policy. These committees should appoint representatives to confer with those responsible for the clinics held at voluntary hospitals and elsewhere. If a central neuropathological department was based on a university clinic the control should be largely in the hands of the university or hospital authorities. If, on the other hand, the key mental unit had arisen from the ashes of the old observation wards, the control should rest with the local authorities. It would be the ideal solution for both sides to meet and constitute a joint governing board.

In present circumstances he believed it would be best for such a clinic to be in juxtaposition with a general hospital, where every form of expert advice was obtainable. In large centres of population the two kinds of mental clinic necessary might be separated: one for less acute cases, receiving psychoneurotic and mild psychotic cases on a voluntary basis, and the other for more acute cases, including those which needed restraint. The unit for the more acute type of case might be formed by the transformation of the observation ward into a psychiatric hospital, and afterwards, as the value of the work was realized, enlightened municipalities might be expected to create buildings worthy of the work undertaken.

But no multiplicity of clinics would remove the need for treatment in mental hospitals, around which, unfortunately, there still gathered a feeling of apprehension and inferiority. This being so, it was important to have "recoverable" units situated, if possible, on a site say a mile or more from the main hospital. With mechanical transport and telephonic communication, the unit could be staffed from the mental hospital, but such a separation would dispel prejudice and give the recoverable mental patient a sense of being treated entirely under hospital conditions.

Problems of Prevention

Treatment of mental disorder, said Dr. Petrie, remained unsatisfactory and largely empirical. The Brock report, presented in 1933 and in danger of being forgotten, stated that inheritance was the commonest single cause, and suggested that, subject to safeguards, voluntary sterilization should be legalized in the case of certain persons. When mentally abnormal persons, generally of the neurotic type, realized their limitations and were willing to undergo sterilization, it seemed a tragedy to withhold it. The same problem applied to defectives. Among the lower type no action was necessary; indeed, in all this group the lack of vitality made the problem of smaller dimensions than might be supposed. The operation on the male side was so trivial that little hesitation need be felt, given the necessary legislation, at performing it. But among females, unless the issue was definitely faced, unnecessary segregation would be imposed in order to prevent procreation of unsuitable citizens. To deprive otherwise harmless people of their freedom owing to absence of means of preventing them from injuring the whole body politic by weakening the next generation seemed unsatisfactory.

A very real trouble was that those who barely came within the range of the Mental Deficiency Acts reproduced their species and so lowered the standard of the race. When they were called upon for service by the State, their inefficiency combined with their asocial conduct became evident. Such types frequently married their type and produced their kind with most disastrous results from the national point of view. Conversely, great blame attached to the higher types in the population who voluntarily sterilized or partially sterilized themselves by unduly limiting their families under the plea of economic necessity. Something more than mere replacement was needed by the higher types, and every form of pressure, social and economic, should be directed to obtaining this result.

Training for Psychiatry

In the training of the medical student there were advantages in associating the teaching of psychology with physiology, but if this portion of the curriculum was overcrowded the subject might be studied with the preliminary sciences as being at least as important as some of them. The student should be taught systematically to study the psychological make-up of every patient he saw. Clerks and dressers might well be compelled as a routine to add a paragraph to their case notes recording the psychology of the patient. The practitioner needed to understand the possible neurotic reactions of his patients, and these could be studied in all departments, not in those specializing in psychological medicine alone. The anxiety states and their variations were of principal importance, but hysterical manifestations, especially those associated with somatic disease, were important also. For the rest, much could be done by teaching the students in observation wards or at psychiatric hospitals which had developed therefrom.

As for the training of the future specialist in psychological medicine, Dr. Petrie raised the question whether the standard of the present Diploma in Psychological Medicine could be raised to fulfil all requirements or whether a higher diploma was needed. All those connected with the present diploma were striving to raise the training and standard of examination: generally speaking, it was the quality of the candidates that rather held back the endeavour. The amount of information expected from candidates was equal to that demanded by similar diplomas. If it were possible to insist on a really high standard the present diploma would largely fulfil any specialist requirements, but it was not attracting the prospective neurologist or the psychotherapist, who felt that his special needs were not met.

There were a number of different schools of psychotherapy, all tending to be mutually exclusive, and an attempt to devise a test of competence was likely to daunt the boldest. Apart from neuropsychiatry and psychotherapy, there had been demands for special diplomas in mental deficiency and, perhaps,

in child guidance. Such a spate of diplomas was not desirable, and the institution of psychotherapeutic diplomas would have the added danger that non-medical psychologists of academic standing might wish to participate. What Dr. Petrie desired to see was a fusion of all these varied interests, so that all sides might participate in a comparatively common training.

STREPTOCOCCAL CROSS-INFECTION IN WARDS

The meeting of the Section of Surgery of the Royal Society of Medicine on November 5, with Mr. E. ROCK CARLING presiding, was devoted to a discussion on streptococcal cross-infection.

The PRESIDENT said that when he first entered an operating theatre carbolic spray had only recently been discarded. It was abandoned because the pathologists declared that, although organisms were air-borne, for the most part they were non-pathogenic. Nevertheless, a dressing technique was devised to protect wounds against air-borne organisms. The whole wound was covered with an absorbent gauze, and if any exudate was anticipated the gauze was covered with a layer of salt and cotton-wool; outside this was a layer of ordinary sterilized cotton-wool, which must have extended at least 1 inch beyond the borders of the inner dressing in every direction, and it was explained that this acted as a bacterial filter. At that time dressers used to strip hands and forearms and plunge them into strong antiseptic until the pathologists explained that this was futile because either the antiseptic must be of such strength that it would damage the skin or the immersion must be so prolonged as to be impracticable. Long-sleeved gowns and gloves, which could be sterilized by boiling, then came into fashion, and shortly afterwards, the importance of droplet infection being appreciated, the use of masks. Under this regime, with well-trained teams, a very high percentage of aseptic results was attained. Surgeons had been a little slow in appreciating the work on cross-infection done by physicians in infectious diseases hospitals, but shortly before the war a good deal was done in wards and theatres both in the study of the bacterial content of the air and in attempts to sterilize the air either by aerosols or ultra-violet light. Some of the experiments were distinctly startling. Perhaps it was not surprising that in the course of a bronchoscopy the flora of the bronchus should within a few minutes be recovered from a distant part of the theatre, but it was surprising that air which had been hitherto entirely free from *B. pyocyaneus* should be found to contain that organism within five minutes of the opening up of an abscess in which it was present. After Dunkirk surgical literature became full of reports of rather more extended investigations, and as a consequence a group of pathologists put forward a document, now published as War Memorandum No. 6 of the Medical Research Council, proposing a development of the technique of war dressings.

Technique of Wound Dressing

Prof. A. A. MILES said that of the organisms commonly concerned in cross-infection in wards *Strep. pyogenes* was most easily traced. It was not the commonest cross-infecting organism, but owing to its pathogenicity it was the most important. The incidence of streptococcal cross-infection depended on various factors, such as sources and channels of infection and state of tissues exposed. In the peacetime surgical ward the streptococcal reservoir was mainly the upper respiratory tract. In war additional reservoirs were provided by wounds infected before admission, and owing to this and to the greater susceptibility of the war wound as compared with the operation wound, hospital infection was commoner. The three main channels of infection—namely, dust, droplets, and transference of streptococci on hands and instruments—demanded separate precautions, which could be divided into those which must be taken apart from the dressing of wounds and those which could be incorporated in the technique of wound dressing.

Defects of dressing technique were often revealed in surveys of the prevalence of streptococci. The technique of wound dressing offered the easiest line of attack in the reduction of cross-infection. In one test, of which the speaker gave particulars, the introduction of an improved "no touch" technique, together with rigid definition and separation of the duties of the dressing team, and special precautions against the carriage of infection from bed to bed, had brought about a marked reduction of hospital infection. Taking two periods, the first being before this technique was introduced, and the second following its introduction, the figures were:

	Air-raid Casualties	Hospital Infections	Therapeutic Operation Cases	Hospital Infections
1st period	32	10	46	2
2nd period	46	1	49	0

The "reservoir" in the wards was much the same in the two periods. The improvement of aseptic precautions did not mean increase in nursing or medical staff or great expenditure of time. Team work made up in speed the time lost in the employment of several persons for one dressing. Prof. Miles emphasized the need for more bacteriologically controlled surveys of ward technique and its results, not only to test the efficacy of different prophylactic measures but to establish that cross-infection was a definite problem, even in wards where its effects were not obvious.

Essentials of Good Technique

Prof. J. PATERSON ROSS said that it was the details—what the late Sir Clifford Allbutt once called the "fiddle-faddle"—of aseptic technique which must be attended to if cross-infection was to be overcome. The essentials of good technique in carrying out the dressing of wounds were:

(1) *Precautions against contamination by dust:* Control of ventilation; bed-making to be completed an hour before dressings started; lids to be provided for dishes and buckets; wounds to be exposed for only minimum time; masks to be worn by attendants.

(2) *Precautions against contact infection:* Fingers never to touch wound, the skin around it, or the dressings next the skin; forceps to be used or gloves to be worn; hands and instruments to be dry.

(3) *Methods of sterilization:* Instruments and accessories for use in dressing wounds to be sterilized by methods known to be effective; cleaning of baths, etc., to be beyond reproach.

Should these methods apply to dressings done in first-aid posts and casualty departments of hospitals as well as in wards? It might be said that if the wound was subsequently cleaned by surgical excision there was no need for aseptic dressing in the first instance; but there was no guarantee that the surgeon would rid the wound of its organisms by excision; moreover, no wound was so bad that it might not be made worse by additional infection. There was serious risk of contamination if a wound was "glanced at" on a ward round, or if the dressing was removed without proper precautions in order that *x*-ray examination might be made. The suggestions just mentioned could be put into effect in any hospital, however old-fashioned, or in a private house. Speed and efficiency were served by having a team of three or four persons, but this was not essential.

There had been a tendency to dress wounds too frequently, and this had led some surgeons to see a solution in the closed-plaster technique; but organisms could get in and out of plaster; and, particularly when the plaster was changed, there was great risk of adding to infection in the wound and spreading infection from it. In a large hospital he thought the surgeon in charge of a unit should be responsible for the good conduct of all the procedures undertaken, whether in operation theatre, wards, or out-patient department.

Reduction of Dust-borne Bacteria

Dr. M. VAN DEN ENDE said that bacteria were carried through the air in droplets or dust particles. Large droplets carrying infective doses had a relatively short range and fell to the ground rapidly. The most effective methods of dealing with these were adequate bed-spacing and masking. Dry dust-borne organisms which were distributed into the air in large numbers during bed-making and floor-sweeping might remain suspended for long periods. There was evidence that the numbers of dust-borne bacteria in the air of wards could be

reduced by the treatment of floors and bedclothes with dust-laying oils.[1] For floors spindle oil was recommended, and for bedclothes a more highly refined mineral oil applied from stable watery emulsions. The composition which had been found most effective contained sulphonated castor oil and technical wet oil in almost equal quantities, together with certain esters. This could be used from watery emulsions which made its application practicable in ordinary hospital laundries. In addition to their dust-laying value, these oils killed any organisms which were deposited in a wet state on the blankets. The equipment for application need not be elaborate. All that was required was that the oil be added to the washing machine in the last stage of washing the blankets. He was not prepared to suggest that everyone should immediately start oiling blankets and floors; the question was still too much in the experimental stage, but the methods had proved effective in reducing the number of air-borne bacteria both in laboratory and in small-scale ward trials. Tests of their efficacy in reducing the incidence of cross-infection were urgently needed, especially in scarlet fever ear, nose, and throat, and diphtheria wards.

A Connected Series of Misadventures

Colonel LEONARD COLEBROOK described some recent happenings in the plastic surgery wards of a certain hospital. On New Year's Day, 1941, a flying officer was admitted with severe burns. He proved to be infected with a Type 12 streptococcus which was resistant to sulphanilamide. He died, as was almost inevitable, in consequence of his burns. But following that case there had been a series of thirteen cross-infections which he thought were directly attributable to it, although the flying officer had been nursed by himself in a room eighty or ninety yards away from the ward where the next case occurred. In all the thirteen cases the streptococcus isolated was of the same type. Some of the cases on admission were infected with a sulphanilamide-sensitive streptococcus, which disappeared under treatment, but a short while later they acquired the resistant strain. Two of the cases were in nurses who had trivial burns on the forearm, one caused by a cigarette, but both acquired Type 12 streptococcus, and the condition took a month to heal. One case was a slight burn on the hand. It had almost healed by the twelfth day, but on that day the patient acquired Type 12 streptococcus, the wound began to suppurate freely, and there was a high temperature. In another case which had been free from streptococci a plastic operation was done on the nose, but fever and suppuration developed, and the graft was lost; again it was Type 12, the sulphanilamide-resistant strain. Here was a series of misadventures with one particular streptococcus, and although there were no major disasters a great deal of trouble was caused. The fact that the strain was sulphanilamide-resistant might have played a large part in the spread, and it almost looked as though this particular strain had other properties which made it particularly invasive to human tissues.

Colonel Colebrook joined issue on one point with Prof. Paterson Ross, who thought that the control of infection should be left to the individual surgeon. In his own belief a supervisor for the control of infection, as recommended in the M.R.C. memorandum, was most desirable. This was a bacteriological problem and should be settled by bacteriologists, not by surgeons. In the past the teaching of students and nurses had been done by surgeons and with the aid of textbooks written by surgeons, and had been entirely ineffective because the surgeons had not themselves been aware of the fundamental facts. An infection control officer was essential for the control of infections in any large hospital. It was a matter which demanded constant vigilance and a change in teaching arrangements.

Dressing by Forceps

Sir JAMES WALTON said that so far in this war there had been little experience of really gross infections, a very different state of affairs from the last war. Large numbers of cases of bomb laceration were seen, operated on as soon as the patients got over the shock; if possible the wounds were sewn up and a dressing put on, which was not removed for ten days, and then there was found to be complete healing. If the wounds were large they were packed with vaseline gauze, and that again was not touched for three or four days. But if there were invasion in this country or if our Army was largely engaged on another front the condition seen in the last war would be seen again. Ever since the last war he had been teaching that dressers should use only forceps and should touch nothing with the hand. He believed that the vast majority of wounds, even large wounds, could be dealt with perfectly well in that way. Imagine a "war emergency" with forty cases of grossly lacerated wounds—how could one man go round and dress them, washing his hands between each case and putting on and taking off gloves? But with the forceps he could dress thirty or forty cases in an hour with ease. Sir James had inspected a large number of hospitals lately, but had not discovered one where the method of dressing by forceps was in being. If that method did obtain he believed the standard of asepsis would remain quite high.

Dr. W. H. BRADLEY suggested that the pattern of spread of streptococcal disease in any community, so long as it was not too complicated by the introduction of a large number of sources of infection, was fairly constant. It was certainly constant in the medical wards and, he believed, in the surgical. The problem of streptococcal wound infections, therefore, was very likely a problem in clinical epidemiology. These streptococcal conditions showed a definite seasonal incidence. The outbreaks tended to last for about three months, they spread slowly, and just when they appeared to be about to disseminate widely they ended spontaneously. He spoke from the point of view mainly of school infections, in which the cross-infection seemed to arise chiefly in the dormitories and to be conditioned by the placing of the beds. He hoped that if supervisors were appointed according to the recommendation of the M.R.C. war memorandum they would concern themselves not merely with the spread of wound infection but with the large general problem of the spread of streptococcal disease. It had been demonstrated in the laboratory that there were numerous potential vehicles, but it was not known which was the infective vehicle.

Surgeon Commander JOHN BUNYAN considered that too much stress had been laid upon the sort of bacteria which were infecting the wound and too little upon the question of healing. If a wound was properly cared for when first received, and if the physiological principles of healing were understood so that the damaged tissue was enabled to be repaired and the factors encouraging bacterial growth were removed, then the question of contamination by bacteria was rather less important. Although an immense natural barrier to infection could be built up by the provision of a more than adequate blood supply to the part and the removal of stale exudate, his experience during the last eighteen months had been that it was possible to prevent secondary infection by the application of the Stannard transparent envelope, a sterile dressing which could be put on in a matter of seconds, would last for three weeks, and would enable adequate treatment of practically any wound to be carried out.[2] He felt that this envelope was very nearly the solution of secondary wound infection in wartime.

Effects of Different Streptococcal Types

Dr. E. T. C. SPOONER said that during a recent six-months period at his hospital 65% of the wound cases were infected with haemolytic streptococci, and a quarter of these infections were acquired in the ward while the wounds were under observation. During this period two intercurrent epidemics were observed, one due to Type 13 streptococcus and the other to Type 4. The former infected in one ward fifteen wound cases and three throat cases. In only one of the wound cases did the patient become seriously ill, but four Thiersch grafts failed, and there was reason to think that the failure was due to streptococcal infection. The Type 4 epidemic behaved very differently. The streptococcus was introduced in five burn cases admitted on the same day, and the streptococcus from these burns spread to four wound cases and eighteen throat cases. The numbers were too small to allow of a fair comparison between the two outbreaks, but in attempting to find some differences between the two strains of streptococci concerned some of the Type 13 cultures were sent to Colonel Colebrook, who found them resistant to sulphanilamide. The Type 4 strain, on the other hand, was highly susceptible. The

[1] See *British Medical Journal*, June 28, 1941, pp. 953 and 970.

[2] See *British Medical Journal*, July 5, 1941, pp. 1 and 7.

difference might have something to do with the different character of spread during the six-months period. All the wound cases in the ward had been fairly generously sprinkled with sulphanilamide powder.

Major H. W. RODGERS said that he had been working in a military hospital where an endeavour had been made to reduce the smell of wounds treated by the closed-plaster technique. They had encased the greater part of the plaster with some absorbent material soaked in antiseptic solution, and then had put another plaster on the top of that, so that there was a kind of chamber between the plasters. This reduced the smell considerably. Would it also reduce the risk of cross-infection?

Prof. PATERSON ROSS still thought that for the control of infection it would be a pity to introduce into the hospital another officer. The better thing would be a closer liaison between the bacteriologist and the surgeon.

THE OTO-LARYNGOLOGIST ON WAR SERVICE

At the meeting of the Section of Laryngology of the Royal Society of Medicine on November 7, the problems of the oto-laryngologist in the war were the subject of discussion.

Mr. E. D. D. DAVIS, president of the Section, who introduced the subject, said that on the outbreak of the war the work of the specialist, hospital and private, almost disappeared. In the E.M.S. each sector was left to make its own arrangements, and while some sectors rose to the occasion, in others the organization was half-hearted. He hoped that oto-laryngologists would insist upon sufficient staff, accommodation, and equipment within the framework of the E.M.S. to enable efficient service to be given to those who required it, and that in the R.A.M.C. oto-laryngology would soon be no longer the Cinderella of the specialties, without proper representation in the central councils. Only relatively few oto-laryngologists could be adequately employed in their own specialty in the Army, and the question was how to occupy such officers fully. But the successful practice of oto-laryngology required a sound knowledge of medicine, and particularly of surgery; the oto-laryngologist must not confine his attention to the ear, nose, and throat. Thus it followed that he could be trained within a short time as a war surgeon. He suggested that ear, nose, and throat work should be concentrated in one well-equipped unit in each E.M.S. sector, Naval base, Army command, and R.A.F. hospital, each unit to have a minimum staff of two surgeons and assistants.

The Royal Navy

Surgeon Rear-Admiral C. P. G. WAKELEY described the position in the Navy, where the ear, nose, and throat surgeon also served as a general surgeon. In many instances there would not be enough work for him to do if he were limited to his specialty. As a rule it was junior medical officers who were selected for ear, nose, and throat surgery. They were given practical courses and afterwards were sent usually to one of the large base hospitals to take over a department under a senior medical officer who was a surgical specialist and in his younger days had himself probably been an ear, nose, and throat surgeon. After experience at the base hospital for two or three years the young surgeon went to sea and probably became the specialist of the squadron to which he was posted, visiting acute cases in the ships of the squadron, and accompanying a case to the naval hospital or hospital ship and performing or assisting at operation. During all this time he was still doing general surgery. After several years, when he had attained the rank of surgeon commander, he might become a senior surgical specialist, with a younger officer under him as ear, nose, and throat surgeon, while he himself was responsible for general surgery. The Navy also employed civilian consultants, who were asked to see special cases at base hospitals and occasionally in hospital ships.

Specialism in the Army

Major DOUGLAS GUTHRIE said that the military practice of the specialty inevitably differed considerably from the civil in its outlook upon prognosis and treatment. Radical operations requiring long after-treatment had little place in the Service. The object was to return the man to his unit as fit and as quickly as possible. During the past two years in a clinic which numbered 3,000 new patients a year he had performed only one radical mastoid operation and not a single frontal sinus operation. Cases in the Army came under three categories: (1) routine cases, such as tonsillitis, deviated septum, and various forms of sinusitis; (2) chronic otitis, still extremely common in the Army and largely the result of long neglect; (3) headache persisting after correction of refractive errors and calling for attention from the ear, nose, and throat department. In Scotland there was good liaison between military and civil hospitals. The E.M.S. hospitals absorbed the overflow in busy times, and the convalescent hospitals took cases a day or two after operation, so that it was possible to admit and discharge cases and to operate three times a week, thus avoiding any waiting list, which in the Army would lead to hopeless muddle. He agreed that the ear, nose, and throat surgeon should be familiar with general surgery, particularly that he should be a potential traumatic surgeon, but not that he should be supposed to remove appendices or perform operations for hernia.

The Emergency Medical Service

Mr. V. E. NEGUS recounted some of the points in his paper published in the *Journal* of October 11 (p. 519). In his experience the oto-laryngologist in the E.M.S. was well and fully employed in dealing with injury and disease. In his sector (IX) there were out-patient clinics for Service cases at six hospitals, civilian sick came from three hospitals in London, and in-patients were dealt with mainly at one large hospital where 200 out of a total of 2,000 beds were available for this special department. The volume of complaints such as acute and chronic otitis media, sinusitis, and tonsillitis, together with nasal and Eustachian-tube obstruction, required the services of a considerable number of specialists. Nearly half of all injuries of the head and neck affected parts other than the cranium, and in dealing with such cases the specialist with expert knowledge of the surgery of the ear, nose, and throat was indispensable. The role of the oto-laryngologist was to treat in his own wards cases of disease within his province, and when casualties arrived to serve as an active member of the department dealing with injuries of the head and neck, in direct collaboration with the neurosurgeon, ophthalmologist, dental surgeon, plastic surgeon, and others.

The Royal Air Force

Squadron-Leader DALZIEL DICKSON described the steps taken on the outbreak of war to establish ear, nose, and throat centres in the existing and projected R.A.F. hospitals. Almost all were staffed by specialists, most of whom had joined the medical branch of the R.A.F. They were in two categories: (1) those who had held specialist hospital appointments or had been in charge of departments in civil hospitals, and (2) those whose experience had been as assistants or house-surgeons. The former acted as regional specialists and the latter were allocated to aviation medical boards. All arrangements for the provision of officers in both groups came under the R.A.F. consultants' department. The regional specialist supervised all researches in so far as they concerned his specialty, and he or his deputy visited each hospital and centre about every six weeks and was available for emergency work wherever required. Treatment was conservative, operation being resorted to only where this was specially indicated. The equipment of ear, nose, and throat departments had been standardized. Most of the departments were self-contained and had adequate bed accommodation and spare consulting and treatment rooms. Unusual cases were transferred to the larger hospitals. Cases of chronic suppurative otitis media which had found their way into the Service as a result of a superficial examination by the recruiting board accounted for a high proportion of such ear, nose, and throat morbidity as was found. Research problems formed a large part of the work of the consultant. He indicated some of these, such as an investigation into the relative merits of means of ear protection during flight, the aetiology of air-sickness, and the standardization of hearing tests.

General Discussion

Major SCOTT STEVENSON said that otology in the R.A.F. was a career in itself, but in other Services this was not so. In the

Army otology was regarded as a sub-branch of surgery. He made no complaint about equipment, which was excellent, but he was deprived of assistance in doing dressings and of secretarial assistance. He was himself "not only a consultant but also house-surgeon, and, further, I do the work of a not very intelligent lance-corporal—in other words, I do all the work of my department." In the Ministry of Health there was an idea, to quote a high official, that ear, nose, and throat work was "peacetime doctoring." That idea must be eradicated. Major C. A. HUTCHINSON said that the otologist in the Army was very well equipped, but the general surgeons had a tendency to annex for themselves the otologists' beds, instruments, and staff. He agreed that otology in the Army was not a career. Mr. A. S. H. WALFORD urged the need for a consulting ear, nose, and throat surgeon in the R.A.M.C. As matters stood, any questions raised by the oto-laryngologist went before surgeons who were probably unfamiliar with the needs of the specialty, and yet whose province it was to advise on appointments, equipment, and organization generally. Major T. A. CLARKE said that he had been an otologist in the Army since the first week of the war, and during almost the whole of that time he had never failed to do what he considered to be a good day's work, comparing very favourably with the idleness of the E.M.S. otologist during the first year. Squadron-Leader G. H. BATEMAN considered himself fortunate to be in the R.A.F., and not less fortunate because he had to do his own dressings. He found that he had learned a great deal from treating "chronic ears."

Mr. MUSGRAVE WOODMAN spoke as regional officer in a sector extending over 150 square miles. He was strongly in favour of localizing the work in certain centres in the area. There were in his area three such centres, each with its wards, under the care of a trained sister, and the sending of cases for operative treatment to one or other of these centres was encouraged. The instruments supplied were old and limited in number, and requisitioning was not without difficulty. He criticized some points of organization in E.M.S. hospitals, which resulted, in his view, in a good deal of wastage.

ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS

ANNUAL MEETING

The annual general meeting of the Association of Industrial Medical Officers was held at the London School of Hygiene and Tropical Medicine on October 25. Dr. R. E. Lane, who retired from the chair after two years' service, was warmly thanked for his leadership during a very difficult time. Dr. M. W. Goldblatt (Manchester) was elected to succeed to the chair. The secretary (Dr. G. E. Graves Peirce) and the treasurer (Dr. M. L. Dobbie-Bateman) were re-elected, and Dr. E. H. Capel (Birmingham) was elected to the executive committee.

Aims of Industrial Medicine

In opening a discussion on "The Progress and Future Development of the Association," Dr. GOLDBLATT said that progress was only measurable when one defined clearly the goal towards which this progress was aimed. In the constitution of the A.I.M.O. this aim was formulated as "scientific study, social intercourse, and mutual help." The concept that medicine was to be applied to industry was not a satisfactory one. Dualism must be avoided here. What they as industrial medical officers had to give must be made a part of industry just as much as engineering and similar branches. They must so apply their knowledge that remedial alterations were made in the industrial environment in the broadest sense. While possessing the interest in individuals they must learn to think in terms of groups. Industrial medical officers failed in their functions if they merely became casualty technicians servicing an ill-run industry by tying up its cuts and scratches: they should be there to find out why they occurred and how their occurrence might be prevented. Previous experience of general practice was very valuable, but it must be realized that, whereas a private doctor could seldom have much control over the home conditions which produced the ills he saw, in industry he could and should control the responsible environment. The doctors had too long been regarded as a sort of remedial "jug and bottle," handing out bottles with increasing automatism. Dr. Goldblatt concluded by warning those starting in industry that they should see that their position in the factory organization was properly defined. It was imperative that the works doctor should have the "ear" of the managing body and should not be responsible to some junior official, as was so often the case.

Dr. CHIESMAN envisaged a State medical service for industry, and hoped that the time would come when the practice of medicine was not dependent, as it was to-day, on commercialized interests. Under present conditions, where the highest bidder could buy a practice, it did not mean that this person was necessarily the most suitable. Under more ideal conditions a central authority would place suitable practitioners in vacancies, both in private and in industrial practice.

Dr. J. C. BRIDGE also visualized the possibility of the effects of post-war control on the location of industry. The present large units, with the segregation of industrial population, seen to-day might one day disappear, with the resumption of small industrial units. Under those conditions the same doctor might supervise the workers' health both in the home and in the factory. While agreeing with Dr. Goldblatt in recognizing the value of experience of general practice, he deplored the fact that so often an industrial medical officer was unable to keep in touch with private medical practice and maintain his interest in clinical medicine.

In the discussion which followed, Dr. T. G. MAITLAND (Liverpool) mentioned some difficulties in the medical care of merchant seamen. Under the present "pool" system the continuity of medical records was not satisfactory. Other speakers, among whom were Dr. D. B. W. ROWE, Dr. E. R. A. MEREWETHER, and Dr. A. J. AMOR, discussed the exchange of essential information among members. The feeling was expressed that an effort should be made to compile literature of interest to industrial medical workers. Dr. PRINGLE considered that the association should develop closer relations with other medical bodies. Dr. MEIKLEJOHN drew attention to the need for an approved form of medical record; he also wished guidance could be given to doctors in the taking of an occupational history.

Some discussion on "political" activities led to the reaffirmation that the A.I.M.O. was a scientific body confining its activities to the social and technical aspects of industrial medicine.

Mr. Kingsley Kay of the Division of Industrial Hygiene, Department of Pensions and National Health, Canada, in an article in the January issue of the *National Health Review*, says that there is little information about health problems in the munitions industry in Canada during the war of 1914-18. At meetings of the Dominion Council of Health and of the National Advisory Committee of Industrial Hygiene in October, 1939, it was arranged that there should be inserted in every Government contract a clause requiring that all health and sanitary conditions be maintained at levels satisfactory to the Minister of Pensions and National Health. This was the outcome of co-operative discussions with the Federal Department of Labour and the then War Supply Board, now the Department of Munitions and Supply. The contract health clause gives the Department power, among other things, to require that suitable medical services are available and that health records are kept wherever it is deemed advisable. Mr. Kay states that the powers provided by the contract health clause are in fact as comprehensive as those granted under the Factories Act, 1937, and the Order issued by the Ministry of Labour and National Service in this country. The Federal Division of Industrial Hygiene has also undertaken extensive educational work in relation to health hazards in the various war industries, and pamphlets on such hazards have been prepared for distribution to both employers and employees—as, for example, on benzol poisoning and poisoning from nitrous fumes and T.N.T.

Local News

SCOTLAND

Future Organization of Hospital Services

Mr. Thomas Johnston, M.P., Secretary of State for Scotland, together with Mr. W. R. Fraser, secretary of the Department of Health, recently attended a meeting in Edinburgh of the Scottish Branch of the British Hospitals Association to discuss post-war policy. Mr. Johnston pointed out that to overcome any local inadequacy of hospital accommodation it was first necessary to place on a more satisfactory footing the present loose partnership between local authority hospitals, voluntary hospitals, and the E.M.S. hospitals under State control. It was proposed, he said, as a first step to lay upon county councils and the councils of the larger burghs the duty of securing, in co-operation with voluntary agencies in the same field, that adequate hospital services were available to all who needed them. To avoid wastage and to ensure the best use of resources, such services must be designed with a view to areas wider than those of individual local authorities, and the more highly specialist services would be afforded at teaching hospitals and other specially selected centres, while between the hospitals as a whole within the region there would be an appropriate division of functions. After discussion the co-operation of the British Hospitals Association was offered to the Secretary of State in any investigation of post-war problems that he may decide to undertake.

On the following day in Edinburgh an address was given by Lieut.-Colonel A. D. Stewart, superintendent of the Royal Infirmary, who also spoke of the need for a wider organization of hospital services. He declared that hospital organization had lagged far behind medical science and discovery. Voluntary hospitals had suffered from their individualism and isolation, and in many there was a financial crisis. They appeared, said Colonel Stewart, to be nearing the limit of their capacity. Either new sources of income must be found or expansion curtailed, in which case the initiative of hospital development would pass into other hands. Hospital waiting lists are a difficult problem in Scotland as elsewhere. Colonel Stewart explained that the more emergency work a hospital did the larger would be its waiting list. Edinburgh Royal Infirmary was carrying out emergency work, both surgical and medical, for Edinburgh and the whole south-eastern area of Scotland. In a progressive hospital waiting lists could never be completely overtaken, for advances in knowledge and the supply of new services would create fresh demands for beds.

In view of this rather troubled picture it is reassuring to have the word of the Secretary of State that: "When account is taken of the hospital accommodation provided in Scotland to meet wartime needs, it is obvious that there is now sufficient accommodation to form the foundation of a hospital system capable of providing for the needs of every person who requires hospital treatment."

Research on War Wounds

A subcommittee of the War Wounds Committee of the Medical Research Council, comprising representatives of Scottish hospital centres and teaching schools, has been set up to foster and co-ordinate research in war wounds and related problems in the field of casualty work. The membership of the subcommittee is Prof. J. R. Learmonth of Edinburgh (chairman); Prof. J. S. Young of Aberdeen University; Profs. R. C. Alexander and D. F. Cappell of Dundee; Profs. C. F. W. Illingworth and C. H. Browning and Dr. D. P. Cuthbertson of Glasgow; and Profs. Sir John Fraser and T. J. Mackie and Dr. C. P. Stewart of Edinburgh. Dr. J. M. Johnston will represent the Department of Health for Scotland. The secretary of the subcommittee is Dr. A. B. Wallace of the Department of Surgery, the University, Edinburgh.

ENGLAND AND WALES

York's New Municipal Hospital

The first half of York City's new Municipal General Hospital was opened recently by Alderman William Wright, who has served for twenty-nine years on the Health Committee, holding office as vice-chairman for seventeen years and chairman for four years. The new hospital, built on the most modern lines at a cost of nearly £100,000, was originally intended to accommodate 360 patients, but only half of the scheme could be put into operation under war conditions. Sir George Martin, chairman of the Leeds Health Committee and of the Yorkshire Regional Hospital Committee, said that the new institution would be very valuable in the regionalization of the hospital services of the county. Making the point that the one thing of real consequence in hospital administration was the patient, Sir George invited the York City Council to get rid of their distrust of the voluntary system and endeavour to make the best of both worlds; and, on the other hand, the voluntary hospital authorities should get out of their rather patronizing manner of speaking of municipal effort when praising the voluntary system. The country, he said, must have a proper working system, with complete co-operation between the two. Sir Francis Terry, chairman of the York County Hospital, who congratulated the City Council on building the new hospital, said that no one welcomed this addition more than the governors of the County Hospital.

London Chest Hospital

Some day, it is to be hoped, the story of the London hospitals under air attack will be told in a suitable volume. Meanwhile an interesting contribution to the literature of London's ordeal is forthcoming in the shape of a booklet on the London Chest Hospital (Victoria Park, E.2), which has been described by Ministry of Health officials as London's worst-bombed hospital in one night's attack. The hospital was founded ninety-three years ago in the City, but within a few years was moved out to Bethnal Green, where the foundation stone was laid by the Prince Consort in the year of the Great Exhibition. It became one of the leading centres for the treatment of chest diseases in Great Britain, with nearly 200 beds and a large out-patient department. The bombing, the results of which are illustrated in the booklet, took place on one night of last spring. It laid the north wing of the hospital practically in ruins, wrecked a part of the nurses' home, and completely demolished, among other buildings, the pathological department (which, incidentally, was started more than eighty years ago by the hospital's founder, Thomas Peacock, who worked here on congenital diseases of the heart and on the fatal disease of the lung known as "grinder's rot"). Although the patients on the night of the raid had elected to remain upstairs not one was killed; all were brought safely into the basement, and next day were transferred to their homes or to other hospitals. An examination of the building showed that in addition to the total destruction of certain parts, the roof had collapsed, and every window frame, door, and ceiling had been shattered. The brave story was continued in the work of reconstruction, for the out-patient department and attached clinics were quickly reorganized, and on the ninth day patients were again being treated. Despite further damage in another raid the wards were in use within four months. But a house at Camberley, which had been used as a sanatorium, has been secured, with accommodation for 30 to 35 patients, and this has relieved pressure on bed accommodation at the hospital and afforded a welcome change of environment for the nursing staff.

According to a correspondent of the *Journal of the American Medical Association*, psittacosis has recently appeared in the Paris area and has become a notifiable disease. There has also been an epidemic of scabies in Paris which has shown three periods of exacerbation, the first among the mobilized, the second at the time of massive evacuation, and the third at the return of the evacuated. Fats have become so scarce in France that ointments will soon become no longer obtainable.

Correspondence

Haemoglobinometry

SIR,—Martindale in the *Extra Pharmacopoeia* remarks, "Although the determination of the amount of haemoglobin is one of the most important of all the chemical tests of the blood, yet as a rule it is one which is determined with less care and by methods more inaccurate than those in use for any other constituents of the body." Most people, I imagine, will agree with this statement.

The two common methods in general use are the Tallqvist scale and Sahli's instrument. The Tallqvist scale is useful in giving an approximate idea of the degree of anaemia and in following the progress of a case under treatment. Few, however, I imagine, would use it for calculating the colour index or (what is perhaps more definite) in distinguishing between macrocytic and microcytic anaemias, the calculation of the mean corpuscular volume and the mean corpuscular haemoglobin content. Outside the laboratory the Sahli instrument is more commonly used for this. The Sahli instrument, of course, depends on the alteration of the haemoglobin to acid haematin. The change of colour here is continuous. About 95% of the change is attained in 10 minutes and it is finally complete in about 40 minutes. And here it seems to me that we get into difficulties.

For some time now, in estimating the colour index or the mean haemoglobin corpuscular content, I have wondered if my results were just what they ought to be. Sahli, in his original description of his instrument in *Diagnostic Methods* (1907), advises: "as soon as the mixture approaches a dark brown colour water is added." The Standing Committee on Laboratory Methods of Glasgow University advises in italics "exactly one minute." The makers of my instrument (Leitz) advise "shaking the tube for one minute and setting aside for 1 to 2 minutes before diluting." Whitby and Britton, in *Disorders of the Blood* (1939), advise a wait of 30 to 40 minutes before diluting. The graduation of my instrument in regard to the quantity of haemoglobin in grammes per 100 c.cm. of blood is the same as that shown diagrammatically in their book. I have made a few estimates with different patients, using first a 2-minute interval before diluting and repeating the experiment after waiting 40 minutes. The average reading after 2 minutes was 76% and for 40 minutes 94%, an average difference of 18%. In view of the above the Sahli method seems to me somewhat unsatisfactory. I have been using a Lovibond comparator with colour disks to compare with undiluted blood in a thin film in a special blood cell. This is graduated according to the Haldane scale, and in its lower ranges should give a closer approximation than the Tallqvist scale. This is a very handy instrument, but I find it difficult to get a close approximation, due possibly to the comparison between a clear glass and a suspension. Tintometer, Ltd., also make colour disks for the Haldane method and the acid haematin method. Incidentally, in the latter they allow 40 minutes for the final change of colour. These may be better than the undiluted blood method, but I have not tried them.

The main desideratum in the estimation of haemoglobin by colorimetric methods is that the change of colour should be rapid and complete. This might be accomplished by nitrites or other reagent giving a change to methaemoglobin, but I think the best solution is the Haldane method. I notice that Cecil Price-Jones in his book *Blood Pictures* mentions Haldane's method alone. To-day, of course, the difficulty with the Haldane method is in obtaining the necessary supply of coal gas. This difficulty, I think, could be overcome by the "sparklet" method. The quantity of carbon monoxide required is not large, so the sparklets could be small. The apparatus for releasing the gas could also be made small enough to go in a case without making it unduly bulky. With this and two standards, one for daylight use and one for artificial light, I think one would have a haemoglobinometer much more satisfactory in its results than the Sahli instrument.

These remarks are made from the viewpoint of the general practitioner and take no account of the more accurate methods used in laboratory technique.—I am, etc.,

Kirriemuir, Nov. 5. ROBT. D. CAMPBELL, M.B., Ch.B.

Fate of the Blood Lymphocyte

SIR,—In his review of *Lymphatics, Lymph, and Tissue Fluid*, by Drinker and myself (November 8, p. 653), your reviewer does me the honour of quoting verbatim some of my views on the defence function of the lymphatic apparatus, but has misrepresented somewhat my views on the fate of the blood lymphocytes. He states: "Yoffey thinks they go to the bone marrow to be the precursors of the red cells and granular leucocytes, but his arguments are not altogether convincing." Actually, while I believe that, on balance, the admittedly conflicting evidence at present available inclines to this view, it is far from proven. It certainly has not been proved to my own satisfaction, as indicated by several passages in the book, of which perhaps I might instance the following (p. 274): "The most careful histological studies of bone marrow have yielded inconclusive results, and the problem will probably not be solved to the satisfaction of everyone until new experimental lines of attack have been devised. If, for example, one could mark the lymphocytes by means of a vital stain, it might be feasible to collect a large number of lymphocytes in thoracic duct lymph, stain them, and reinject them into the blood. Examination of the bone marrow some hours later would show whether any of these marked lymphocytes had reached it. Possibly the statistical study of lymphocyte development used by Kindred (1940) may be further utilized."—I am, etc.,

Department of Anatomy, University of Bristol, Nov. 11. J. M. YOFFEY.

Dark-adaptation Tests and Vitamin A Deficiency

SIR,—Since many workers are using studies of dark adaptation as a means of detecting deficiency of vitamin A, it seems undesirable to allow the conclusions of Dr. E. Wittkower and his collaborators (October 25, p. 571, and November 1, p. 607) to pass unchallenged. In a group of admittedly psychopathic soldiers who complained of night-blindness they found only about one-third with subnormal dark adaptation. Arguing that the diet of these men must have been adequate in vitamin A, they conclude that "the value of dark-adaptation tests for the discovery of night-blind patients and as an indicator of vitamin A deficiency appears doubtful." This statement is clearly open to several important criticisms, which may be summarized as follows:

1. There is no doubt at all that poor dark adaptation is in fact associated with vitamin A deficiency. (*a*) Experimental diets deficient in vitamin A result in defective dark adaptation, which is reversed when the vitamin is taken. (*b*) Poor dark adaptation is commoner among individuals from the lower-income classes. (*c*) In almost all instances such poor dark adaptation is improved by the administration of vitamin A. To state, as do Dr. Wittkower and his colleagues, that the diet of their subjects was adequate in vitamin A is surely begging the question. It has been shown by numerous investigators that apparently normal diets are frequently not adequate in this vitamin, and that many individuals consuming them show poor dark adaptation which is cured by the administration of vitamin A.

2. A more serious criticism, however, is that the conclusions of Dr. Wittkower and collaborators are based on a *non sequitur*. They find that subjects suffering from severe psychological disturbance may complain of night-blindness, and that this may or may not be accompanied with demonstrably defective dark adaptation. Thus, they argue, the test cannot be used for the detection of deficiency of vitamin A. In other words, psychopathic individuals may show diminished powers of dark adaptation, and hence the measurement of this would probably detect mental instability rather than vitamin A deficiency. An analogy might perhaps best demonstrate the invalidity of this argument. A hysterical patient complains of defective vision or hearing. She finds it impossible to see the test type or to hear the ticking of a watch. Are we then to conclude that such visual or auditory tests cannot be used for the detection of organic blindness or deafness?

Subjective tests such as those for dark adaptation are, of course, dependent to a large extent on the co-operation and mental state of the individual being tested, and no one would deny the importance of bearing this in mind. The paper by

Dr. Wittkower and his co-workers serves a useful purpose in drawing attention to the psychological aspects of tests for night-blindness. In so far, however, as it attempts unwarrantably to minimize the usefulness of such tests for the nutritional worker, it is to be deplored.—I am, etc.,

Dunn Nutritional Laboratory, Cambridge, Nov. 7. JOHN YUDKIN.

Blood Transfusion and Syphilis

SIR,—The number of persons now receiving blood transfusion is increasing due both to war conditions and also to a natural extension of the practice. The transmissions of syphilis by this means are, as at present recorded, relatively very few, but there may be more cases not reported for obvious reasons. Further, it would seem that war conditions have increased the number of persons suffering from syphilis.

The risks would lie in two classes of blood transfusion: (1) that of whole blood immediately used, and (2) perhaps in stored whole blood used early. The Wassermann, or any other serological safeguard, cannot entirely eliminate the risks of transmission. There might be, for instance, cases (*a*) where the person tested is incubating the disease. (*b*) where a chancre is present but the case is in an early sero-negative stage, and (*c*) where a person has acquired the disease after being tested and prior to being called upon to give his blood. The expense and time consumed in serological tests are considerable. The administration of whole blood practically immediately after withdrawal from the donor would be, in an infected donor, a very grave matter, especially in the early stages of syphilis referred to above, and in which the serological tests might be negative during the septicaemic stage.

In regard to stored blood it is a fact that *Treponema pallidum* is stated to be able to survive for considerable periods in various materials from infected persons and animals. Reference to Volume 8 of the *System of Bacteriology* will give some data on this matter. We do not know of any work which has been conducted on the survival of *Treponema pallidum* under refrigerator storage conditions.

From the above considerations it appears to us that the work of Kast, Peterson, and Kolmer,[1] and especially a recent publication by Eichenlaub *et al.*,[2] are of premier importance. The latter group of workers used mapharsen to rid infected citrated blood of *Treponema pallidum*. They found that 0.01 gramme per 500 c.cm. of citrated blood was amply sufficient for the purpose, and based this finding largely on work on rabbits which were exposed to infected material without the addition of the arsenical mapharsen. Mapharsen is of relatively low toxicity, and, in the amount suggested, the dose is so small as to be most unlikely to affect even a very seriously ill person. Further, the drug is directly antitreponemal and does not require chemical action to form arsenoxide. Contraindications might arise in cases where the recipient was suffering from (1) haemorrhagic purpura, (2) exfoliative dermatitis, (3) hepatic disorders, and (4) renal disease. The cost of sterilizing against *Treponema pallidum* in 500 c.cm. of citrated whole blood would be relatively small.

While in no way claiming to possess any expert knowledge in regard to blood transfusion, the method advocated by Eichenlaub and his collaborators would appear to us to add yet another safeguard to the recipient of a blood transfusion. We venture cordially to congratulate the above workers, and also to suggest that the value of the method shall be considered by those more qualified than ourselves to judge of its practicability and utility.—We are, etc.,

H. A. COOKSON, M.B., F.R.C.P.Ed.
November 10. W. GILLIES ANNAN, M.D., F.R.C.S.Ed.

Possibility of Malaria in Britain

SIR,—Dr. I. F. Mackenzie's letter (November 8, p. 668) is a timely reminder to general practitioners and those temporary Service medical officers who have little or no experience of malaria. As a result of the technique of investigation, treatment, and control evolved since the last war, I think it would be fair to say that there is less risk of oversight on the part of regular medical officers of all Services.

Malaria is a potential danger wherever "carriers" and anopheline mosquitoes coexist, but certain areas were especially dangerous in the last war. Cases of indigenous malaria have occurred in certain areas after every war in which troops have been exposed to infection over-seas, and the present war will probably be no exception. Thanks to the knowledge with which we are now armed, and given early diagnosis and efficient treatment of indigenous cases, there is little danger of the latter ever reaching serious proportions.

The following table is taken from *Observations on Malaria* (H.M.S.O., 1919):

Carriers of Malaria under Treatment during May to September, 1918

1918	Sheppey		Lydd		Sandwich	
	In Hospital	Not in Hospital	In Hospital	Not in Hospital	In Hospital	Not in Hospital
May	—	491	12	74	13	7
June	—	552	7	84	14	18
July	—	550	Nil	24	10	47
August ..	—	349	1	23	8	17
September ..	—	46	1	33	6	32

The above figures relate to men from over-seas. During 1918 sixty-one cases of indigenous malaria in serving soldiers were reported. Each case was carefully investigated; none had a previous malarial history and most of them had never been out of this country. The indigenous character of the infection was established in every instance. Forty-two cases occurred in the Sheppey, Isle of Grain, Sandwich, and Lydd areas, and the remaining nineteen were distributed between Aldershot (4), Suffolk (6), Norfolk (2), Essex (2), Sussex (1), Leicester (1), Notts (1), Lincs (1), and Herts (1). Twenty-nine foci of infection were located.

References to "ague" in the literature of the sixteenth century make it clear that malaria was endemic in England at that time. It is now practically, if not quite, extinct, not because of any sanitary measures specifically designed for its eradication, but as a fortuitous result of the improvement in the general sanitary condition of the country.

Introduction of a natural reservoir of infection in the form of malaria patients from over-seas certainly supplies what Dr. Mackenzie calls "the missing link"; but Service authorities are fully alive to the risk to the civil population thereby entailed, and every care is taken to render patients parasite-free before they are "turned loose" on the uninfected anopheline. It must not be forgotten that even in peacetime there is a continual traffic of infected civilians on leave from over-seas, who are usually far less carefully supervised.

It is doubtful whether medical officers of health do all they might to discover and eradicate anopheline breeding-places. I have in mind certain stagnant pools and miles of derelict canals which I have myself dipped and proved to be prolific nurseries of anopheline larvae.—I am, etc.,

Brookwood, Nov. 9. H. M. STANLEY TURNER.

"Euglamide" in Treatment of Burns

SIR,—In the *Journal* of March 29 (p. 469) we reported the results obtained in burns treated with a glycerin sulphonamide paste termed "euglamide." Briefly these results appeared to indicate that the use of the paste led to prompt healing and that it might be of value in the treatment of third degree burns and in burns of the hands and face. Work on this subject has been continued, and we have made several alterations in the dispensing, though the principle of using a water-soluble sulphonamide in glycerin has been retained.

(1) Work which one of us (J. M. R.) has carried out in collaboration with Major G. I. Scott has shown that a solution of sodium sulphacetamide (supplied in a 30% solution by British Schering Ltd.) exhibits a much higher chemotherapeutic activity than a similar solution made by dissolving the solid material (supplied by the same firm) in water. For this reason we now use the 30% solution in making up the euglamide.

(2) By making up the paste with "eucerin" (a proprietary ointment base made from the oxycholesterin of wool fat and

[1] *Amer. J. Syph. Gon. ven. Dis.*, 1939, **23**, 150.
[2] *Arch. Derm. Syph.*, 1941, **44**, 441.

paraffin, supplied by Herts Pharmaceuticals, London) instead of kaolin and cod-liver oil, a material is obtained which penetrates more readily all parts of the injured area and shows no tendency to dry or cake.

(3) Higher concentrations of the sulphonamide have been employed and the paste at present favoured is one which contains 10% of the sulphonamide in its liquid phase. The formula of this material is:

30% solution of sodium sulphacetamide (albucid soluble)	135 c.cm.
Distilled water	65 c.cm.
Glycerin	200 c.cm.
Eucerin	400-450 grammes

The liquid constituents are mixed together in a mortar or other suitable receptacle and the eucerin is then gradually added and mixed until a suitable paste forms.

The results so far obtained with this "euglamide" have been satisfactory, though sufficient data have not yet been gathered to justify a communication on the subject. At the same time we thought it worth while to report briefly our progress in this investigation.—We are, etc.,

J. M. ROBSON.
A. B. WALLACE.

Departments of Pharmacology and Surgery, University of Edinburgh, Nov. 12.

Operation for Reduction of Fractures of the Os Calcis

SIR,—Surgeon Lieut.-Commander W. G. Campbell (November 8, p. 651) has not described a new method of treatment for certain types of fracture of the os calcis. The method was first described to me by Böhler in 1935, and he learnt it from, I think, Kirschner. Further, the method is described and illustrated in Watson Jones's most excellent book (first edition, p. 625, Figs. 951 and 952). It would be interesting to know its true originator.

From an extensive experience of manipulative reduction of fractures of the os calcis by a pin placed in the axial plane of the posterior fragment I can say this: (1) it is a suitable method for comminuted fractures of the os calcis with a large posterior fragment associated with depression of the posterior articular facet of the os calcis; (2) after manipulation, if too much force has not been used, the radiograph in the lateral view shows an exact anatomical reduction; (3) this exact reduction is frequently not confirmed in the axial (plantar-dorsal) radiograph of the os calcis, because manipulation by the axial pin does not correct the displacements associated with fractures of the sustentaculum tali and the buckling of the outer wall of the os calcis. When an exact reduction has been confirmed by two-plane radiography it is wise to incorporate the pin in the plaster for a period of six weeks, otherwise with such a comminuted fracture the reduction will be lost. I have experimented with various designs of pin and methods of manipulation, and from that experience I can assure Commander Campbell that the method is not simple and that it does require more than a minimum of surgical skill.—I am, etc.,

WILLIAM GISSANE, F.R.C.S.

Birmingham, Nov. 10.

SIR,—I read with interest the description by Surgeon Lieut.-Commander W. Gordon Campbell of a simple reduction of certain fractures of the os calcis. I can agree whole-heartedly with him as to the simplicity and efficacy of this manœuvre with regard to the overcoming of the pull of the tendo Achillis in most of these os calcis fractures. I have been accustomed to using this simple spiking of the posterior fragment associated with lateral compression and fixation in plaster during the past four years, and regard it as being one of the most satisfactory ways of regaining the normal shape of the foot. I have never known any harmful sequelae, and not one patient has complained of the small scar which was left at the back of the heel.

My experience has been similar to that of most people, that while there are many methods of re-establishing the shape of the foot, these methods have little effect in restoring the movements of the subtaloid joint. This simple operation can be carried out to give a good shape to the foot after a great majority of compression fractures of the os calcis.

After restoring the depth of the heel and accentuating the normal arch of the foot, I believe that the most important next step is that the patient should be fitted with a moulded arch support in order to relieve the ligamentous strain which is inevitable when he starts walking again.—I am, etc.,

A. N. BIRKETT.

Nottingham, Nov. 11.

Endoscopic Resection of the Prostate

SIR,—I was much interested in Mr. H. T. Cox's note on endoscopic resection of the prostate (October 25, p. 583). It would be a pity if the idea gained ground that by fitting a check to the resectoscope the external sphincter could, therefore, be certainly protected. I do not believe this on the following grounds. (1) In the course of a resection frequent reference must be made to the verumontanum as a guide to the sphincter. It is manifestly impossible to retain the resectoscope in a fixed position if an efficient operation is to be carried out. (2) It appears to me to be bad practice to cut if haemorrhage obscures the view. (3) In my experience of some hundreds of cases, using both the McCarthy resectoscope and the Gershom Thompson punch, intra-urethral (and intravesical) projection of the prostate form the majority. Consequently the prostatic urethra varies in length from one side to the other, and where a middle lobe exists measurement by any gadget must be entirely misleading. Moreover, when a prostate has been incised it tends to shrink, so that any measurement taken at a first resection is unlikely to be of any value in a repeat performance.

It is difficult to follow Mr. Cox's reasoning in his recommendation "to leave the most prominent part of the prostatic ledge at the internal meatus." Surely the first task is to expose the fibres of the internal sphincter all round the bladder neck. These fibres are easily identifiable, and such exposure permits prostatic tissue to prolapse more easily into the urethra.

No, Sir, the great trouble with the loop resectoscope is the difficulty of using it. The visual field is often poor, and structures are not seen in their natural size or position. The instrument is delicate and temperamental, and the smallest piece of clot adhering to the distal end means complete obscurity of the field of operation. May I suggest to Mr. Cox that he transfer his affections to the Gershom Thompson direct-vision punch, when his fears of "black-outs" will vanish. After all, the world's best work in the field of this problem has been done by Gershom Thompson, Emmet, and their colleagues.—I am, etc.,

W. E. M. WARDILL.

Newcastle-upon-Tyne, Nov. 10.

Sulphonamides for Ophthalmia Neonatorum

SIR,—The treatment of ophthalmia neonatorum has been greatly simplified in the past few years by the introduction of sulphapyridine and sulphathiazole. The usefulness of these drugs in this dangerous disease is not widely enough known, and even recent textbooks do not stress sufficiently their use in this connexion.

Either sulphapyridine or sulphathiazole can be used; the dose recommended is 0.125 gramme (1/4 tablet) three-hourly for the first twenty-four hours, then four-hourly for the next twenty-four hours, and, finally, six-hourly for four days in all. The drug is given crushed in sweetened water and is well tolerated, but should be stopped if it causes vomiting or should a diffuse rash appear. The response is invariably prompt and satisfactory; in twenty-four hours the oedema of the lids will be much less, and in forty-eight hours the discharge will have almost ceased and the eyes are open. I have treated many cases in the last three years with most satisfactory results, the infants being detained in hospital not more than seven days.

The advent of the sulphonamide compounds has rendered local treatment of the infected eyes unnecessary. The simple instillation of medicinal paraffin to prevent the lids sticking is all that is required. The special nurse and frequent irrigation are no longer necessary. Recent experiences would seem to point to the fact that some practitioners still rely solely on local treatment to the eyes. This is no longer justifiable, and it is of the utmost importance that either of the compounds mentioned be administered as soon as the signs of ophthalmia appear, and thus any permanent damage to the eyes will be prevented.—I am, etc.,

WILLIAM J. CLANCY,
Obstetric Officer.

City General Hospital, Sheffield, Nov. 7.

Diabetes and Mersalyl Diuresis

SIR,—Dr. T. Markowicz (November 8, p. 670) describes a case of diabetes complicated with chronic nephritis and oedema in which mersalyl improved the diabetic condition, and he asks for the mode of its action. We have used mersalyl in some thirty oedematous diabetics (and salyrgan in many more) without observing any specific effect other than diuresis. The latter, by diluting the urine, will reduce the percentage of urine sugar, and the removal of oedema may so improve the general condition and tissue circulation that the diabetic metabolism is greatly ameliorated thereby. Without knowing all the details necessary for a full appreciation of his case, we suggest that the above two factors, and especially the latter, explain the improvement he describes.—We are, etc.,

R. D. LAWRENCE.
W. G. OAKLEY.

The Diabetic Department,
King's College Hospital, S.E.5, Nov. 10.

SIR,—In reply to Dr. Tadeusz Markowicz's letter (November 8, p. 670), in which he reports an improvement in a patient suffering from diabetes mellitus and chronic nephritis following the administration of mersalyl, I feel that one simple explanation deserves consideration—namely, that the improvement was due to the diuresis. The disappearance of the ascites and oedema would surely help the patient to feel "a new woman."

The figures for the urinary output for the twenty-four hours following the first and second injections are given as 58 and 92 ounces respectively, and the urine is stated to have given an orange colour on boiling with Benedict's solution after the first injection, while after the second one the colour produced was green. This suggests that the apparent reduction in the amount of sugar in the urine was due to the dilution of the urine following the diuresis produced by the mersalyl, as after the second injection the total urinary output for the twenty-four hours was almost twice that following the first injection, and, other things being approximately equal, one would expect to find a lower percentage of sugar in the second specimen, and consequently a lesser degree of reduction of Benedict's solution.

Two further points upon which further information is necessary before any conclusions as to the influence of mersalyl upon the course of diabetes could be drawn are: (1) the nature of the patient's diet during the forty-eight hours during which the urine was sugar-free without the administration of insulin; and (2) whether the "improvement in the patient's general condition" included the passing of urine which gave a green reaction to Benedict's solution, or whether the percentage of sugar in the urine rose again during the nine days after the second injection. In the absence of definite information along these lines, I would suggest that the improvement was caused by the removal by mersalyl of the oedema due to the chronic nephritis rather than to any specific effect upon the diabetes.—I am, etc.,

R. H. TRINICK.

Billericay, Essex, Nov. 8.

Treatment of Burns and Wounds by Envelope Method

SIR,—At last! The papers on the subject of the treatment of burns and wounds (July 5 and 12) and your leader of the latter date present a complete review of this problem, which I have read with great interest. At last there is emerging a better comprehension of all the difficulties and of a principle upon which they may be overcome. This principle includes adequate preliminary cleansing and disinfection, prevention of secondary infection, and the provision of drainage—in other words, Listerism. Active movement of the injured part, even if it be a wound, is advised, in spite of the opinion of others that such a measure is apt to light up infection. What are we to think? Of course, I do not admit this danger. Fixation or movement is entirely secondary in importance if secondary infection be controlled. We can do just what the case dictates with this proviso.

As to the manner in which the principle is to be applied Lister made no limitations when he said: "For sure I am that, however much the means of carrying out the antiseptic principle may come to vary from those which we now use, the principle itself will certainly be ultimately recognized as the most important of all those that shall guide the practice of surgery; and the sooner our profession is aware of this, the better will it be for suffering humanity." For the benefit of those who may be unaware, he also said: "Of all those who use antiseptics in surgery, I suspect I apply them least to the wound." It is evident that Lister did not believe in continuous irrigation. He contended that antiseptics, however mild, interfered with healing and the separation of sloughs, and also the inhibition and destruction of the residue of infection remaining, by the unimpeded reparative and protective agencies of the body cells and fluids. With regard to the dressing of the wound he said: "After the first dressing, the object which I always aimed at is to have the material in contact with the exposed tissues approximate as close as possible to the perfectly bland and neutral character of the healthy tissues." So in a devious, tortuous, and difficult way we come "back to Lister."

However promising the results may appear which follow the closed contact plaster method and that of the envelope, I predict their passing in favour of a complete and secure application of the antiseptic principle, contending that neither of those in use complies with its requirements and both smack too much of the same old trial-and-error ways which have been our expedients through the ages. I cannot refrain from protesting that any method introduced to the profession which makes it obligatory in its adoption to use but one reagent, proprietary or not, is invidious. Yesterday it was "dettol," to-day it is "milton"; both are valuable preparations, but I do not feel dependent on either of them. Any reliable antiseptic will serve, and this is as it should be; all of them or any one will suffice in applying the antiseptic principle, "and the sooner our profession is aware of this, the better will it be for suffering humanity."—I am, etc.,

A. C. F. HALFORD, M.D., F.R.A.C.S.

Brisbane, Queensland, Sept. 18.

Treatment of Wound Shock in First-aid Posts

SIR,—In your issue of November 8 Dr. R. L. Kitching makes some suggestions with regard to the equipment of first-aid posts for the purpose of warming up seriously injured patients.

In the first place I should like to join issue with him when he expresses the view that cases should not be sent direct to hospital, but should be treated for shock in a first-aid post "until they are fit for operation." Experience in Spain, in London, and some of our larger cities has shown that the sooner the patient reaches hospital the better, and that in serious cases the patient is usually sent direct from the incident without going to a first-aid post. Elaborate first aid is undesirable and is, in fact, impossible under the conditions existing; it is usually dark and the patient covered with dirt, soot, and brick dust; all that can be done is to splint or control a fractured limb, apply, but very rarely, a tourniquet, and cover the stretcher and the patient with blankets. It is a question whether even dressings over the wound are of any particular advantage unless for the purpose of controlling haemorrhage, and the application consumes valuable time. In many hospitals where large numbers of cases had to be dealt with few dressings were applied in the receiving room, but the patients were rapidly classified according to the severity of the injury and sent to the appropriate wards. Fitness for operation can only be decided by an experienced surgeon or physician at the casualty hospital, and resuscitation carried out at a first-aid post may be negatived by a subsequent journey in an ambulance.

The foregoing applies, of course, to casualties occurring in a city where a hospital is comparatively close, and I agree with Dr. Kitching that where, as in his case, the first-aid post is separated from the hospitals by eight or twelve miles, the post can play an important part in combating shock in the interval between reception of the cases and the arrival of the ambulances. Judgment will be needed in deciding whether a case will receive more benefit by being kept for a short time in the post or by being sent as quickly as possible to hospital.

There is no question that warmth, posture, and the giving of fluids are of prime importance in combating shock, but I think that the method of heating described by Dr. Kitching is unnecessarily elaborate. A good supply of warm blankets and hot bottles is essential, but I would suggest that the method of warming patients adopted in the last war by regimental aid posts and field ambulances is much simpler and equally effective. The stretcher is supported on trestles, and on the floor beneath a primus stove is placed with a sheet of metal on top. A

blanket is arranged to hang down on either side of the stretcher to confine the heat. With reasonable care this method is free from danger and economizes space. It is important to bear in mind that blankets between the patient and the stretcher during transport are just as important as those placed over them.—I am, etc.,

Leeds, Nov. 12. H. COLLINSON.

SIR,—Dr. R. L. Kitching (November 8, p. 668) suggests that as a rule such cases should be sent to a first-aid post. There are several objections to this: (1) On the spot the first-aid party man may not have discovered either the shock or the condition causing it. (2) In most cities and towns the hospital should be as near as a first-aid post for early treatment. (3) For the proper treatment of cases of shock there should be a resuscitation room with a constant heated temperature of not less than 70° F.; this does not exist at any first-aid post that I am aware of (some hospitals probably also have not got this constant temperature). (4) To carry out the excellent suggestions he makes would require a special trained staff of nurses (not auxiliaries); of what use would the auxiliary nurse be who passes an examination on the signs, symptoms, and treatment of greenstick fracture, fainting, varicose veins, and types of slings, and *truly nothing more*? (5) If the case is one of internal haemorrhage or other condition demanding immediate operation there would be the added danger of delay against a possible recovery.

Since the first thing a shocked patient requires is heat (unless the shock is from haemorrhage or pain) then this is where a mobile unit is of greatest value: it can do all that is necessary. I am not sure that the present policy of keeping them at posts is altogether right, as one would require certain information from hospitals—whether a given number of cases of shock if they had had the required treatment on the spot of the injury would have recovered. I certainly am of the opinion that a mobile unit should go out at all major "incidents" as a routine. There is a tendency to rely too much on first-aid parties, whereas more mobile units with their doctors, trained nurses, and full equipment are likely to secure more successful results with all types of injuries. The idea, mooted in another quarter, to put the casualty treatment in the hands of a particular association would be calamitous. The suggestion of keeping blankets warm at first-aid posts is excellent, and this should be done; but what is required is to bring these blankets warm to the sites of injuries, and this can be done in a mobile post with a double-lined tin box with hot water between the two linings.—I am, etc.,

Nov. 10. A. G. N.

Mobile Units

SIR,—Of your many correspondents on this subject some appear to have waited patiently for the ideal conditions to set up a mobile aid-post as originally planned, and in their disappointment have condemned the units as a useless extravagance; most of the others (I exclude the writers from rural areas whose elaborate coaches are designed for a different need) appear to have seen no alternative but to go out with one or two nurses in their own cars and send back for the full unit if circumstances demanded.

In this borough we hit on a compromise which seems to me to combine many of the advantages of both the full mobile and the light car and which is worth recording. My colleague, Dr. L. J. Soutter, and I, who were in September, 1940, responsible for the borough's two mobile units, were very quickly convinced that to await the conditions for which we, in common with other mobile unit doctors, had trained ourselves and our teams would mean an indefinite waste of trained and eager personnel; we therefore obtained permission, while keeping one van with its team always ready to function as a full unit, to convert the other into what was christened the "incident squad." The heavier equipment was removed, only that likely to be required for strictly first-aid purposes being retained, and the van (a 30-cwt. Morris) was staffed by a doctor, a sister, and three auxiliary nurses, each one being provided with a haversack, over the stocking and packing of which great care was taken; the haversacks were packed exactly alike so that each nurse knew just what her haversack contained and could find anything in it in the dark. The "incident squad" was out between twenty and thirty times last winter and did some very useful work.

The scheme has all the advantages of the light car method while having behind it a variety of equipment which a car cannot carry; it also allows for a larger number of nurses than a car can carry and for the keeping of records. No two "incidents" are exactly alike, and it is wise to keep an open mind as to how to act on arrival, but we have been able to deal satisfactorily with trapped casualties, to attend a certain number of the cases at major incidents without delaying the quick evacuation of the remainder by stretcher-bearers, and finally, when the serious cases have all been evacuated, to make a canvass of the neighbouring houses, which very often discloses a number of minor casualties who would otherwise receive no attention until the following morning at the earliest. If no further orders have been received from Control, a stop is made on the return journey at any rest centre which has been opened; in addition to finding minor casualties here, we have twice found epileptics whose supply of luminal has been destroyed, and three times we have found diabetics who have lost their insulin; both these drugs are now carried in the vans.

The two units undertake "incident squad" work alternately for a week at a time, and the girls are encouraged to use their initiative and, when necessary, work on their own. Nothing has been more gratifying than to see how the raw recruits of two years ago are acting to-day as cool and confident individualists.—I am, etc.,

Hornsey, Nov. 13. G. F. RIGDEN.

Practical Results of Diphtheria Immunization

SIR,—I have read the letter from Dr. Ralph Weaver, M.O.H. for Brisbane (November 8, p. 669), in which he claims to have achieved striking results in the reduction of diphtheria incidence in Brisbane following a three-and-a-half-years immunization campaign. He bases his claim (*a*) upon the figures for nineteen months (1940 and part of 1941), and (*b*) after having immunized 22,912 children out of a population of over 320,000.

I would suggest that these data are far too small to justify Dr. Weaver's optimism. It would be easy to cite cities where immunization has been carried out quite as thoroughly as and over a longer period than in Brisbane, but where, so far from a reduction, an actual increase in diphtheria has occurred. Yet it would be quite unjustifiable to assert that this was the result of the immunization campaign. Both the incidence and mortality from diphtheria fluctuate notoriously from year to year, and it will only injure the cause of immunization if claims to have achieved results are put forward too hastily. I would suggest to Dr. Weaver that he would be well advised to warn his local authority that diphtheria incidence in Brisbane may again go up in spite of his immunization campaign, and that mortality may increase if the type of the disease changes, rather than talk at this early stage about "a diphtheria-free Brisbane being not far distant."

For myself, I have during the past twelve months personally immunized nearly 5,000 children in a population of only 40,000, a much higher proportion and in a shorter time than Dr. Weaver has accomplished in Brisbane, but I am not so sanguine as he is about abolishing diphtheria.—I am, etc.,

Leicester, Nov. 7. C. KILLICK MILLARD.

Vaccinia as a Complication of Vaccination

SIR,—According to official statistics for the five years July 1, 1932, to June 30, 1937, public vaccinators in England and Wales reported 1,026,588 vaccinations. In the same period there were recorded fifteen definite cases of vaccinia and eleven doubtful cases, with one death. If the doubtful cases are included this gives an incidence of 1 in 39,484 vaccinations and a death rate of one in over a million vaccinations. In view of the rarity of this complication it would seem worth while to put on record a recent case, which unfortunately had a fatal termination.

On October 2, 1941, at the request of the parents, I vaccinated a boy aged 3¼ and his baby sister aged 7 weeks. I usually prefer to vaccinate babies when three to five months old, but this baby seemed to be perfectly healthy and there was no reason to anticipate any abnormal reaction The result in the case of the boy was absolutely normal and satisfactory with no complications whatever

A week after vaccination I found that the baby had developed at the site of vaccination on the lateral aspect of the left thigh one

typical vesicle. Two days later there appeared a vesicle on the front of the left ankle, and this was the precursor of a succession of vesicles occurring mainly on the limbs, with a few on the face and very few on the trunk. The distribution was identical with that of variola, and the stages of the eruption also corresponded. The baby's general condition remained good for five days after the appearance of the vesicle on the ankle. By this time most of the rash was in the pustular condition, and the evening temperature became elevated to the region of 101° F. About this time two vesicles appeared on the tongue. Small doses of sulphanilamide (a quarter of a tablet every four hours) with bicarbonate of soda were given, but after twenty-four hours this had to be stopped because of diminution in the renal output.

By the morning of October 18, owing largely to the lingual involvement, there was difficulty in swallowing, and rectal injections of glucose solution were begun. The baby and mother were admitted to hospital for a continuation of the rectal injections, to which were added two or three minims of coramine. It was hoped that by tiding the baby over the dysphagic phase she might in the course of a day or two be able to resume swallowing and so maintain her body fluids. The prognosis, however, became less favourable by the appearance of haemorrhage into some of the spots. In hospital she became gradually weaker, and died in the early morning of October 19.

The guaranteed calf lymph employed was obtained in two small capillary tubes and was quite fresh. As the boy was not at all adversely affected it is to be assumed that no fault can be attached to the lymph and that the occurrence of vaccinia and the subsequent death were traceable to hypersusceptibility on the part of the baby. It is a matter for speculation whether, in the absence of vaccination, this hypersusceptibility might have appeared later in life in the presence of any other infection.—I am, etc.,

Corbridge, Nov. 12. J. N. TURNBULL, M.B., F.R.C.S.Ed.

Treatment of Scabies

SIR,—I have read with interest the correspondence in the *Journal* on the prevention and treatment of scabies.

Most general practitioners are, I think, agreed that treatment with benzyl benzoate is the method of choice. Unfortunately, in an area like my own, where cases are numerous, this preparation is not always obtainable. I have regularly applied the treatment described by Dr. E. W. Prosser Thomas (November 1, p. 631) with satisfactory results. Each patient is supplied with the necessary amount of 10% sulphur ointment, and instructed to return after three days of intensive treatment, bringing with him, in order to minimize the risk of a sulphur dermatitis, any unused ointment. The patient is also given typed instructions as to procedure, similar to those issued by Dr. Prosser Thomas.

I am quite sure that without proper disinfesting of garments and bedding recurrence of the condition and further infection of contacts take place not infrequently. My experience in this respect has been interesting. In the area of my practice there are two adjoining authorities in whose area the majority of these cases occur. One authority, on the morning of the fourth day after treatment has commenced, sends for and removes all clothing and bedding, returning them to the house of the patient on the same evening after thorough disinfesting. In the case of the other authority no facilities exist for this purpose. The majority of my cases have occurred in the area of the former authority and a recurrence has been rare. In the case of the authority where no assistance is given, and the unfortunate household have to do their best to disinfest bedding and clothing, reinfection is a common occurrence.

Until notification of this disease is compulsory and the prevalence of the condition is brought home to those in authority, there would appear to be little chance of stamping out this unpleasant condition.—I am, etc.,

Warkworth, Northumberland, Nov. 6. R. E. MOYES.

Post-war Medicine

SIR,—The correspondence on State Medical Service shows neither sign of termination nor of contribution to progress. I presume (although perhaps I am unduly optimistic) that the supporters of a State Medical Service, like the supporters of private practice more or less in its present form, are persons who desire to attain the best possible service to the community with reasonable security and remuneration for the doctor. Surely, then, it is necessary to determine what is wrong with the present state of affairs, because to propose a doctrinaire solution of all difficulties is no part of medicine, even if it is characteristic of much that passes as politics. We get no further by vituperation, even when it is in the mild form of an accusation that we doctors have a "vested interest in disease." One becomes inured to the sloppy mode of expression that characterizes most of the writing on State Medical Service, but let us never become reconciled to it.

It is alleged that the practice of medicine is "sick"; let those who say so indicate the nature and aetiology of the maladies that afflict it. If they can do so it will then be time enough to discuss the cure; but let it be remembered that there is a very limited pharmacopoeia (according to the supporters of State Medical Service): either leave things in what is alleged to be their present horrid state or turn the medical world inside out. The fact that there are those among us who prefer whole-time appointments (and do their best work in them) while others prefer "piece-work" does not prevent these gentry from advocating a Procrustean bed into which the second group must be forced.

Mr. Wilfred Shaw's fourth point (*Journal*, November 8, p. 665) that we should plan a medical Utopia and then work towards it is admirable, but we can only work with the material that is available. In the name of all that is sensible let us, as doctors, avoid the stupid view that we should dislike any Utopia (and indeed deny that it is a Utopia) unless it is attained by the means that our preconceptions have led us to believe are the only decent methods.

The stupidities into which the scholastic philosophers were led by their adherence to the deductive method should surely be a warning to us to stick to the experimental route that has led our profession so successfully to its present state. No general principle can have greater strength than the observations on which it is based (unless the supporters of a State Medical Service regard their first principle as being divinely inspired); and we are therefore not bound to accept any one view to the exclusion of all others.

The questions are, What is wrong with medicine to-day? and, What shall we do about it? This is very different from the doctrinaire statement that what is wrong with medicine is private practice, and that all that is needed is to do away with that.

In conclusion I should like to inquire what remarkable changes we are to expect if a State Medical Service comes into being. Is there to be less disease; is research to progress more rapidly and more successfully; or is all we shall gain but the status of civil servants?—I am, etc.,

London, N.W.1, Nov. 8. A. PINEY.

SIR,—Mr. Wilfred Shaw's letter (November 8, p. 665) is provocative, as no doubt he meant it to be, and I hope that the implications of paragraph 1 will not pass unnoticed.

Far-reaching political changes are inevitable after this war, but whatever political party is in power will most certainly regard the future health of the people as a political issue of the first magnitude, and to ignore this fact is criminal folly on our part. Further, it must not be supposed that the public is disinterested in this matter. It has become health-conscious in spite of, and not because of, us; nevertheless it will seek our help in the future as never before in the attainment of a greater degree of good health for all. The public will play an important part, both in and out of Parliament, in determining the future medical services available to it, and will naturally look to us for guidance, but it will look in vain unless and until we are prepared to take a far wider view than we have done hitherto.

We are in the midst of a world war, and in this country political parties have sunk their party differences to form a coalition the more energetically to pursue the war to a victorious conclusion and to speak to the world with a united voice. Can we not, in our own small way, do the same? Is it Utopian to suggest that a British Medical Corporation should be formed by an amalgamation of all existing representative medical bodies? Is it hopeless to expect such organizations to sink their differences? Is it impossible to speak with one voice? Are we, as a profession, so far lacking in public spirit, enter-

prise, and wisdom that we are prepared to witness the unedifying spectacle of the various organizations to which we belong drifting farther and farther apart without raising our voices in protest? Are we to continue on this slippery path to perdition? Will we gain by it, will the public, or will they be the losers as well as ourselves?

I venture to suggest, Sir, that the formation of a British Medical Corporation would be received by Parliament and public alike as an earnest of our intention to put our own house in order. If the suggestion I put forward could be accomplished, we would be in an unassailable position, as a united, authoritative body, to discuss the future medical welfare of the country with the Government. There are difficulties inherent in this suggestion, but are they insoluble? I am not concerned in this letter with actual plans for the future of medicine; I plead for union in the profession under one organization as an absolute necessity.—I am, etc.,

London, S.W.1, Nov. 13. R. PROSPER LISTON, M.B., Ch.B.

SIR,—There is considerable disquiet among the profession at statements in the Press and in Parliament as to various schemes for altering the terms of both hospital and domiciliary practice without reference to those most intimately concerned with such changes—namely, the medical profession and the public. At a moment when, in the words of the chairman of the B.M.A. Medical Planning Commission, they are "simply exploring the whole field of medical practice" before even attempting to put forward concrete suggestions to the whole profession (which must surely precede consideration by the Government), it would seem necessary to insist that all such unofficial schemes, including those made, for example, by the Nuffield Trust, are not only provisional but indeed premature. It would indeed be fatal if the impression should gain ground that any such suggestions are the considered opinion either of the profession or of the public when neither have been consulted in the matter. That this impression is growing is shown by reports of discussions in Parliament and in the lay press.

One hears from some provincial towns that representatives of the workers have stated that if any attempt is made to regiment them into any State or local government scheme of which they do not approve they will endeavour with the collaboration of the profession to run a voluntary hospital and domiciliary scheme on their own: an interesting commentary on the query of Sir Frederick Menzies as to the essential differences between State and voluntary hospitals as judged by the public.

Another fact which is in danger of being forgotten is that a large number of the younger members of the profession are on Service, and neither the Government nor we who are at home have any right to legislate for them until after the war when they will have returned and can express their views. One hears again that few of them are anxious to see any violent upheaval in the terms of practice, be it hospital or private.

At any rate one would feel reassured to learn that those of our profession in touch with Government circles are making it clear that, while we are interested in any suggestions for post-war medical planning, all schemes adopted and alterations made at the moment must be considered as being purely war measures, which may or may not, as judged by the profession as a whole, remain as part of our peacetime organization.—I am, etc.,

London, N.6, Nov. 13. W. LEES TEMPLETON.

Medical Education

SIR,—I should like to comment, from the point of view of a schoolmaster who trains about twenty medical students a year, on recent articles on medical education. I fully agree with the view that a physician should have a wide general culture and with the opinion that he is too often without it, but I do not think that "paper changes," such as postponing the study of pre-medical subjects to the age of 17, or taking the First M.B. only from the medical schools, would really attack the problem. The difficulty which the schools have in educating the future medical student is that the universities will mostly accept men to read medicine whom they would reject from most of their honours schools. We cannot refuse to teach these boys, and the result is that the biological sixth, while it usually contains some very good pupils, also has many who are far below the normal sixth-form level, both intellectually and culturally. Few schools are large enough to separate the two classes, and the teaching of the good boys is dragged down to the level of the others. In this school a partial separation is possible, and most of the better pupils stay for a third year in the sixth; to them we give a good general education; for the others we do the best we can.

I would suggest three remedies, all linked together, of which the universities could put two into practice almost at once. First, a raising of the standard of entrance to the medical schools to approximately that demanded of the honours student. Second, the provision of more scholarships to make up for the loss in numbers caused by the first. Third, the rapid recognition of the schools as the proper place for the pre-medical subjects and the acceptance of a pass in appropriate subjects in the Higher School Certificate in place of the First M.B. The special examination for the latter might in time cease.—I am, etc.,

Manchester Grammar School, Nov. 10. BRUNSDON YAPP.

Science and World Order

SIR,—I do not think that Mr. O. J. R. Howarth (November 8, p. 671) is justified in saying that the conference of the British Association was the first attempt at international understanding among scientists made in this country. Since the beginning of the war many British scientific bodies, including the Royal Society of Medicine, have turned their activities in this direction, and although less advertised these have been no less successful. I do not deny in my letter that certain foreign representatives had been given a prominent part in the conference, but these were the distinguished Ambassadors of the United States, Russia, and China. This may give a political but hardly a scientific stamp to the conference. Further, the fact that smaller nations were not treated so bountifully has aroused a certain amount of ill feeling which goes against international understanding, for at scientific conferences representatives should not be treated according to the surface area of their countries. I apologize, however, for having said that out of sixty speakers only one dealt with the principal international problem of to-day—European starvation and threat of epidemics—and I accept Mr. Howarth's assertion that "no less" than four speakers referred to the subject. Even so, the proportion is tragically inadequate.

The object of my letter was not criticism of the British Association conference but a constructive proposal for a really international and strictly scientific conference for examination of actual scientific problems. For convocation of this conference the principal British scientific bodies should come to an understanding, for despite its greatness the British Association is not the exclusive representative of British science. Next, contact with the foreign scientific organizations should be made and the plan of the conference should be arranged by British and foreign representatives jointly. An international conference is not built up by a restricted group of scientists belonging to one nation who direct the activities of all the others as they see fit. This is a method of "new order" which is doomed to failure.—I am, etc.,

London, W.1, Nov. 10. A. P. CAWADIAS.

"Perfect Sight without Glasses"

SIR,—I have noted your annotation "Perfect Sight without Glasses" (September 13, p. 383) and the letter from Dr. J. Parness (p. 389). The work of the late W. H. Bates, M.D., is carried on by his widow, Emily A. Bates, who classifies herself as a "teacher of eye education, Bates method." Just over seven years ago a friend of mine became so interested in this method that he arranged for Mrs. Bates to visit this city and hold classes. He and scores of his friends, after two weeks' educational course, decided to give up their glasses. I discussed this method with those who were taking the course. They were very enthusiastic, and were quite convinced that they could get along without their glasses. They were able to do so for varying periods, but, in general, only until the enthusiasm subsided. Within a matter of a few months they were all wearing their glasses again, and have continued to do so.—I am, etc.,

S. J. STREIGHT, M.D.,

Toronto, Oct. 9. Medical Director, Canada Life Assurance Company.

Obituary

WILLIAM FORDYCE, M.D., F.R.C.P.Ed., F.R.C.O.G.

Consulting Gynaecologist, Edinburgh Royal Infirmary

Dr. William Fordyce, who died in retirement at Tillicoultry, Clackmannan, on November 6, was for many years one of the leading obstetricians and gynaecologists in Edinburgh. His death removes the last survivor of a famous group of contemporaries who maintained and enhanced the reputation of the Edinburgh Medical School in that branch of practice and teaching. They included Sir Alexander Simpson (nephew of Sir James Young Simpson), Sir J. Halliday Croom, Dr. Freeland Barbour, Dr. D. Berry Hart, Dr. Milne Murray, Dr. J. W. Ballantyne, Dr. J. Haig Ferguson, Dr. F. W. N. Haultain, and Dr. Lamond Lackie.

Dr. Fordyce was born in 1863 at Liverpool, but both his parents were Fife people, and he was sent to school at Anstruther in Fife and read for an Arts degree at St. Andrews University. He went on to study medicine at Edinburgh University, graduating M.B., C.M. with first-class honours in 1888, and proceeding to the M.D. degree in 1893 after postgraduate work at Leipzig and Berlin. He took the M.R.C.P.Ed. diploma in 1896 and was elected F.R.C.P.Ed. in 1898. Personal friendship with Sir Alexander Simpson drew Fordyce towards midwifery and gynaecology, and he assisted Simpson for several years in the work of his university chair at Edinburgh. Later he was appointed lecturer in the Extra-Mural School of the Royal Colleges and was elected to the visiting staff of the Royal Maternity and Simpson Memorial Hospital as assistant obstetric physician; some time afterwards he was appointed to the obstetrical and gynaecological staff of the Edinburgh Royal Infirmary. He was also for many years gynaecologist to the Leith Hospital and to the Hospital for Women in Archibald Place.

Dr. Fordyce was noted for his diagnostic powers and operative skill. He was a regular attendant at meetings of the Edinburgh Obstetrical Society and often contributed to its proceedings; he became President of that society in 1919 and devoted his presidential address to a historical survey of the development of gynaecology. He had been a member of the British Medical Association for forty-five years, and at the Annual Meeting in Edinburgh in 1927 was vice-president of the Section of Obstetrics and Gynaecology. In 1929 he was one of the Foundation Fellows of the Royal College of Obstetricians and Gynaecologists. He retired from active practice about ten years ago.

Outside his profession Dr. Fordyce had many interests. He was a keen fisherman and golfer, and enjoyed curling. His turn for the writing of light verse was well known to a wide circle of friends, and he often sang or recited his own compositions at medical and other dinners. Of these he was persuaded to publish privately a selection in a small volume entitled *The Old Sport and Other Verses*. He had been for many years a member of the Scottish Arts Club.

H. MORELAND McCREA, O.B.E., M.D.

Dr. Hugh Moreland McCrea, who died on November 8, was born in Belfast in 1877 and came of medical stock; both his father, John McCrea, and his grandfather, Prof. Dill, were well-known physicians in Belfast. He was educated at the Royal Academical Institute, Belfast, and left as head of the school to enter Queen's University as science scholar. He was naturally attracted to the medical side of the university, and in a distinguished career obtained in succession the only two medical scholarships then existing in Belfast University.

After two years' residence in hospital he came to England, and for a few years practised at Wargrave, where he soon made a reputation as a consultant physician. In 1907 his practice as a consultant had so far increased that he decided to come to London. He married the daughter of Charles Hannen of the Chinese Customs. In 1915 he was appointed physician to the City of London Military Hospital, and there acted as senior physician for five years. He was anxious to serve abroad, and in 1916 was actually appointed O.C. of a hospital fitted out for Salonika, but two days before the unit sailed a medical board refused to pass him as fit for duty over-seas, to his great disappointment. At the end of the war, and while still carrying out his duties at the military hospital, he was appointed chairman of the second final Medical Appeal Board of England and Wales. In addition to this he took a large share in organizing the Emergency Medical Corps under the auspices of the Royal Society of Medicine. The corps was a very active body, and actually answered no fewer than 68 air-raid calls. He was awarded the O.B.E. for his distinguished service.

But Dr. McCrea's most enduring contribution to medicine in London is the London Clinic, which owed its origin to his inspiration and its realization to his energy. He was chairman of the Medical Advisory Board, and for years it was the chief centre of his ambition, and only those who worked with him can realize the almost insuperable difficulties with which he had to contend.

Those who worked with Dr. McCrea will feel his loss as a physician of wide human sympathies, whom they could always call upon in cases of difficulty and whom they were sure would spare no exertion to help his patient. But they will miss him most as a real colleague and a very dear friend.

H. S. SOUTTAR.

Sir G. LENTHAL CHEATLE writes:

The death of my friend Dr. Hugh Moreland McCrea terminates the activities of an alert, wise, and busy mind. On the public side of his life he founded the present London Clinic and Nursing Home. Its chief objects were to supply private patients with all the privileges and advantages of a first-class public hospital. Its reach for some insurmountable reason was premature and beyond the grasp of those who supported him; but it did result in building the only institution of its kind in this country that contains within its walls a pathological laboratory and *x*-ray department, each separate and under the control of men of the highest reputation. The ideals that gave rise to its birth would have supplied all the requirements in the treatment of private patients, and may yet be realized. In the conduct of his private practice Dr. McCrea achieved these ambitions. At his own expense he established a laboratory and an assistant for the proper examination, control, and treatment of his patients. His kindness and competence will be for ever missed by those who were fortunate enough to come under his skilful care. Dr. McCrea's life was an example to all those who practise medicine.

Mr. VICTOR BONNEY writes:

By the death of Hugh Moreland McCrea a very remarkable man is lost to our profession. The qualities in the aggregate required to make a great clinical physician are much more rare than those needed to make a great surgeon, for the problems presented to the latter are solvable chiefly by touch, sight, and personal dexterity, whereas those with which the physician has to cope require not only the piecing together in order of importance a number of data obtained from various sources but the correct deduction from the whole assemblage. The power of doing this varies with individuals, but from time to time men appear who, possessing a faculty for retrieving and marshalling in surprising context impressions latent in subconsciousness, have it in remarkable degree. The term *flair* is commonly used to describe this faculty, and McCrea was one of these gifted persons. To the gift was added an insatiable zest for professional knowledge which was continually added to by acute observation and voluminous reading. The result was a many-sided physician without one weak facet, so that whatever the nature of the case he brought to it the ability of an expert in that particular malady. His outstanding professional qualities became so widely recognized that he may justly be termed the consultant's physician, so many of them did he number among his patients. His energy and kindness matched his abilities, for he threw his whole heart into every case, great

or small, to which he was called, and a multitude is in his debt. His passing enhances a regret, often felt before, that he was never on the staff of a teaching hospital, where the high ideals and deep mine of clinical lore of which he stood possessed could have been passed on to the younger men coming after him.

ROSA BALE, L.R.C.P.&S.ED.

Dr. Rosa Bale died at Barnstaple on November 3, after a brief illness. She had her professional training at the London School of Medicine for Women and obtained the Scottish triple qualification in 1892. She was the first woman to start in general practice in the West of England, and up to last March still did a little work for old patients and friends at her home in Plymouth.

For nine years Dr. Bale ploughed a lonely furrow and faced much opposition and abuse. But she lived to prove that her job was a woman's job, and a long list of her patients and friends proves that she did it well. She was a woman of strong religious principles: week by week she held a women's Bible class and helped many a weary woman to hold on to the Christian faith. Strong for temperance, she always took her place among the band of workers in our midst who pleaded the cause of total abstinence; but she prescribed alcohol when needed. When the Passive Resistance movement was strong against the levying of the education rate, because religious instruction was not given in the council schools, she year by year took her place in the court and a piece of her furniture was sold to pay the rates. She was a Suffragist, and although non-militant she did her bit to win votes for women.

Her home was seriously damaged by enemy action. Then began the first signs of illness of which she was to die. Up to that time she had refused to seek safety because, in her own words, "the Plymouth Education Authority have not evacuated the school children: I cannot leave Plymouth and those for whom I work, and prove myself a coward." Since March she had lived with her brother and sister at Barnstaple, but she grieved sadly for her Plymouth friends and home. Many will remember her association with the Plymouth Education Committee, the Council of Social Service, the Mental Deficiency Committee, the Salvation Army, and temperance work. She did much to improve the midwifery service both as a teacher at Three Towns Nursing Association and as a practitioner.

Dr. Bale was a member of the British Medical Association for forty years and of the Medical Women's Federation (ex-president S.W. Association); she was also an honorary member of the oldest medical society in Plymouth, being the second woman doctor allowed to join it. Her associations with her medical colleagues were always of the happiest, and she inspired the younger medical women with her wise advice and help. When she had done thirty-three years' practice at Plymouth she was presented with an illuminated address of thanks by her women medical colleagues for her wise pioneership and guidance. Since her start in practice forty-three years ago some twenty to thirty medical women (and more in other parts of the West of England) have followed the path which she pioneered, so that to-day in Plymouth medical women are in practice in surgery, medicine, pathology, radiology, and public health: a candle light has become a flaming torch. Beloved by all, setting a noble example, always ready to help the needy and poor, Rosa Bale has passed from our midst and we mourn a great woman.

MABEL L. RAMSAY.

We announce with much regret that Dr. JOHN CARSON LOUGHRIDGE died on October 5 at his residence, Whitewell, Co. Antrim. He was educated at Queen's College, Galway, and Queen's University, Belfast, and took the Scottish triple qualification in 1892. Dr. Loughridge was a hard-working member of the British Medical Association, to which he had belonged for thirty-four years. He was chairman of the Belfast Division in 1924-5; president of the Ulster Branch and a member of the Central War Emergency Committee in 1929-30; member of the Central Council from 1931 to 1939; member of the Irish Committee from 1932 to 1936; and representative at seven Annual Representative Meetings from 1925 to 1931. Dr. Loughridge had been dispensary medical officer of Whitewell area for many years. Apart from being a local magistrate he was associated with many charitable organizations in his district. Some years ago he was bereaved of his only son, Dr. Jack Loughridge, in a motor accident near his home at Templepatrick, Co. Antrim. He is survived by Mrs. Loughridge, to whom the sympathy of all his colleagues is extended.

Dr. WILLIAM PARKER died on November 4 at Farndon, Cheshire, at the age of 75. Born at Rossett, Denbighshire, he graduated M.B., C.M. at Edinburgh in 1887, at the age of 21, and in the same year started practice at Holt, a few years later moving across the Dee to reside at Farndon. He had a very wide and extensive country practice among people who came to recognize and value his ability, kindness, and great consideration for others. He lived a life of altruism, the financial side of practice being quite a secondary one to him. The affection his patients had for him was deep and abiding, and was manifested in many ways in words and in deeds. When, due to failing health, some five years ago he retired, more than a thousand, rich and poor, subscribed to a testimonial of their regard for him, which included a cheque for about £400. His special hobby was farming and stock-raising, and he much enjoyed discussions with his many farmer friends of the merits of certain breeds of cattle, of which he had practical and erudite knowledge. My friendship (writes W. H. L.) with him dates back to our student days, and as the years passed it became closer and dearer. It could be truly said of him that he was one that loved his fellow men. A true man, of whom all who knew him thought and spoke well and regarded with affection and esteem. He is survived by his wife and daughter.

Although Dr. JAMES KINGSTON BARTON retired from practice a good many years ago, there must be still a very large number of colleagues and patients who will mourn his death, which occurred recently at Wimbledon at the age of 87. From St. Bartholomew's Hospital, where he was Bentley Scholar in 1874, he qualified M.R.C.S., L.R.C.P. in 1875, and was ophthalmic house-surgeon there; he became M.R.C.P. in 1894. For a great number of years he practised in South Kensington, close to Gloucester Road Station, where he had a very extensive clientele indeed. He was the founder and a lifelong supporter of the Kensington Medical Reading Society, which in the end supplanted the much older similar social medical club known as the Brompton M.R.S. Not only at the meetings of this friendly collection of colleagues but in many other ways as well he could be relied on to help and encourage junior practitioners with freely dispensed wisdom and advice. As the years went on he became the admitted doyen of South Kensington practitioners, affectionately looked up to by patients and doctors alike. As far back as 1900 he published *Records from General Practice*. His strong lean face was often lit up by the twinkle of a kindly humour, and his whole outlook was one of humane and upright urbanity, with a pleasing self-confidence in his own really great professional ability. At a time when the black tailed coat and the stiff white collar were still thought indispensable for a Kensington doctor, Barton adopted flannel shirts and tweed suits; yet never gave the slightest impression of being unsuitably or untidily dressed. He was also one of the first in his district to give up his horsed carriage and adopt the "new-fangled motor," which he often drove himself. Nor did he rely on a garage service to diagnose and treat the ailments of his car: the writer vividly remembers seeing him in the street more than thirty years ago with smears of black oil on his face as he emerged from investigating some disorder in the interior of his engine. A very exceptional doctor and a very exceptional gentleman.

E. J. B. Miller (*Med. J. Australia*, 1941, **1**, 614) records the case of a boy aged 14 who in convalescence from varicella developed iridocyclitis of the right eye and paralysis of the sphincter pupillae. When seen eight months later the pupil was still dilated, but the fundi were healthy and there was good binocular vision.

Universities and Colleges

UNIVERSITY OF CAMBRIDGE

The Appointments Committee of the Faculty of Biology "B" will shortly proceed to appoint a University Demonstrator in Pharmacology. Particulars of this post, which will be governed by the Statutes and Ordinances of the University, may be had from the secretary of the Appointments Committee, Mr. H. E. Tunnicliffe, Department of Physiology, Cambridge, to whom application should be addressed before December 9.

At a Congregation to be held to-day (Friday, November 21) a Grace is being submitted, on the recommendation of the General Board, that the Final M.B. Examination begin in the present term on Monday, December 8, a day earlier than is prescribed by Ordinance. The number of candidates for this examination is abnormally high, and it is not possible to conduct the examination in the normal manner.

During October the titles of the degrees of M.B., B.Chir. were conferred by diploma on E. H. M. Gillieson and R. M. Stevenson of Newnham College.

UNIVERSITY OF LONDON

WESTMINSTER HOSPITAL MEDICAL SCHOOL

An entrance scholarship examination in anatomy and physiology will be held on Thursday and Friday, December 11 and 12. Two scholarships will be awarded, each to the value of £75. Further particulars can be obtained from the Secretary, Westminster Hospital Medical School, Horseferry Road, S.W.1.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

At a meeting of the Council of the Royal College of Surgeons of England, held on November 13, with Sir Alfred Webb-Johnson, President, in the chair, Messrs. R. Milne, R. Davies-Colley, G. T. Mullally, V. Zachary Cope, C. E. Shattock, and E. W. Riches were re-elected members of the Court of Examiners for the year beginning December 11, 1941.

It was proposed to hold a Buckston Browne lunch on Thursday, February 12, 1942.

Diplomas

Diplomas of Membership were granted to the 159 candidates whose names were printed in the report of the meeting of the Royal College of Physicians of London in the *Journal* of November 8 (p. 675).

Diplomas in Public Health were granted, jointly with the Royal College of Physicians of London, to L. C. Lodha, L. G. Norman, and M. A. G. Ward.

SOCIETY OF APOTHECARIES OF LONDON

The following candidates have passed in the subjects indicated:

SURGERY.—T. L. Benson, H. V. T. Payne, G. M. Pearson, R. L. Skea, J. S. Taylor, S. S. Zoha.

MEDICINE, PATHOLOGY, AND FORENSIC MEDICINE.—C. R. Deuchar, J. S. Taylor, H. A. Worthy.

MIDWIFERY.—M. Fishman, M. C. Hannon, W. J. Lewis, Pak So, W. C. Salter.

The diploma of the Society has been granted to G. M. Pearson, J. S. Taylor, H. A. Worthy, and S. S. Zoha.

The Services

MENTION IN DISPATCHES

Surgeon Lieut. Patrick O'Brien, R.N. (H.M.S. *Defender*), has been mentioned in dispatches for gallantry and distinguished services in operations in Greek waters.

CASUALTIES IN THE MEDICAL SERVICES

ROYAL ARMY MEDICAL CORPS

The name of Major MARTIN MCAULEY MORROW is included as "Died" in an Army Council Casualty List published on November 8. He was educated at Queen's University, Belfast, where he graduated M.B., B.Ch., B.A.O. in 1936. He entered the R.A.M.C. as lieutenant in 1938, became captain in 1939, and was recently promoted to major. He had been a member of the British Medical Association since 1937.

Prisoners of War

Major Arnold Gourevitch
War Substantive Captain John Hunter Annan.
War Substantive Captain Lachlan Maclean.

Medical Notes in Parliament

Health in the Debate on the Address

A new Session of Parliament was opened by the King in person on November 12. The Speech from the Throne spoke of the strengthened resolution of the British Nations to prosecute the war to final victory, and announced that Parliament would be asked to make further financial provision for its conduct. A promise was given that the Government would continue to take all practical steps to sustain the health and well-being of the people under the stress of war.

Speaking in the House of Lords on November 12 during the debate on the Address, Lord ADDISON praised the Speech's emphatic declaration about the health of the people, and welcomed the steps which were being taken to provide more milk for school children. He thought the war provided opportunities for developments in improved nutrition which peace hitherto had not made possible. He hoped for further advances and said the Labour Peers would, at an early date, ask the House of Lords to consider this subject. Lord MOYNE, in reply to the debate, said the Government's Colonial policy must press on with the improvement of health facilities. At home, despite the suffering and waste of war, they had improved the social services. The remarkable record of national health was largely due to the food policy of Lord Woolton, which had brought nutrition on the best scientific advice within the reach of many who previously suffered from some deficiency. To-day had brought the announcement that children up to the age of 2 were to get free supplies of vitamins.

Mr. CHURCHILL, speaking in the House of Commons on November 12, said an Education (Scotland) Bill was required so that full effect might be given in Scotland to the Government's scheme for nutrition of children by maintaining a high standard among school children and by expanding as rapidly as possible the provision of meals and milk in schools. He went on to say that the dietary of the people, though curtailed and less varied, was sufficient for physical health. He hoped the Government would be able to give a larger share of available supplies of meat to the workers who needed it most. This would be done by rapid expansion of canteens. The Minister of Food had been able to make, during the winter months, minor relaxations in his restrictions.

In fulfilment of Mr. Churchill's promise of November 12, the Education (Scotland) Bill was introduced in the House of Commons on November 13 by Mr. T. JOHNSTON. It proposes to amend the law regarding the provision by education authorities of food and clothing to school children.

Committee on Nurses' Salaries.—On November 11 Mr. ERNEST BROWN told Sir Joseph Lamb that the present terms of reference to the committee under the chairmanship of Lord Rushcliffe extended only to the salaries and emoluments of nurses who were either State-registered or in training with a view to State registration, including any members of the staff of public assistance institutions covered by this definition.

Purchase Tax and Diagnostic Reagents.—Mr. PRICE asked the Secretary to the Treasury whether it was intended that all biological products used for medical and veterinary purposes should be exempted from purchase tax; why such items as tuberculin, Johnin, and *B. coli* antiserum solely used for veterinary purposes were not referred to in Statutory Rules and Orders, No. 1390, 1941; and if he could put this matter right at an early opportunity. Captain CROOKSHANK said that exemption was intentionally confined to certain medicines and drugs of a specially costly character considered essential for the treatment of disease, and in the case of veterinary preparations for the treatment of serious diseases of livestock of economic importance. Diagnostic reagents were not regarded as taxable medicines, and it was accordingly unnecessary to exempt substances such as those mentioned in the second part of the question which were prepared for such use.

The Vienna Health Office has recently asked for the most rapid institution of measures to obtain serum from convalescent cases of poliomyelitis. All persons who have had the disease within the last six years are invited to offer their blood.

No. 44

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended November 1.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for : (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for : (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases ; a blank space denotes disease not notifiable or no return available.

Disease	1941 (a)	1941 (b)	1941 (c)	1941 (d)	1941 (e)	1940 (Corresponding Week) (a)	1940 (b)	1940 (c)	1940 (d)	1940 (e)
Cerebrospinal fever	102	3	26	1	3	132	3	23	1	3
Deaths		—	1				—	2		
Diphtheria	915	61	295	28	27	1,282	39	489	28	36
Deaths	22	1	9	—	2	33	1	10	—	6
Dysentery	123	14	51	—	—	81	—	39	1	—
Deaths		1	—	—	—		—	1	—	—
Encephalitis lethargica, acute	2	—	—	1	—	3	—	—	—	—
Deaths		1	—				2	—		
Enteric (typhoid and paratyphoid) fever						28	2	10	1	1
Deaths						2	—	—	—	—
Erysipelas		—	47	11	5		17	63	5	3
Deaths		—	—				—	—		
Infective enteritis or diarrhoea under 2 years										
Deaths	59	3	13	25	7	43	6	14	9	2
Measles	624	46	19	43	5	12,592	176	458		14
Deaths	2	—	—	—	1	25	—	2	1	—
Ophthalmia neonatorum	79	3	22		1	76	1	21		—
Deaths										
Paratyphoid	35	4	4	—						
Deaths	1	—	—	—						
Pneumonia, influenzal*	553	18	6	—	3	572	34	11	1	3
Deaths (from influenza)	11	1	—	—	4	20	4	1	—	—
Pneumonia, primary			152	13				156	10	
Deaths		—		11	—		58		16	7
Polio-encephalitis, acute	1	—				5	—			
Deaths		—					—			
Poliomyelitis, acute	23	—	5	3	1	34	—	9	—	—
Deaths		—	—				1	—		
Puerperal fever	—	—	14	1	—	1	1	12	3	1
Deaths		—					—			
Puerperal pyrexia	118	6	24		—	119	3	21		—
Deaths										
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	1,204	36	245	60	35	1,789	50	266	73	52
Deaths	—	—	—	—	—	2	—	—	—	—
Small-pox	—	—	—		—	—	—	—		—
Deaths		—	—	—	—		—	—	—	—
Typhoid†	20	2	3	4	9					
Deaths	1	—	—	—	—					
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough	1,955	188	50	15	4	1,740	11	129	—	22
Deaths	9	3	—	—	—	14	2	—	1	—
Deaths (0–1 year)	325	23	73	36	16	327	28	58	21	15
Infant mortality rate (per 1,000 live births)										
Deaths (excluding still-births)	3,941	493	558	196	137	5,502	1,322	587	169	108
Annual death rate (per 1,000 persons living)			12.1	13.0	‡			11.9	11.3	9.5
Live births	4,678	443	760	246	200	5,011	481	730	253	182
Annual rate per 1,000 persons living			15.5	16.3	‡			14.8	16.9	15.9
Stillbirths	157	17	37			219	24	31		
Rate per 1,000 total births (including stillborn)			46					41		

* Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

† Includes paratyphoid A and B for Northern Ireland.

‡ Owing to evacuation schemes and other movements of population, birth and death rates for Northern Ireland are no longer available.

EPIDEMIOLOGICAL NOTES

Discussion of Table

A general decline in the incidence of infectious diseases in England and Wales occurred during the week, the only exception being cerebrospinal fever with an increase of 14 cases compared with the preceding week. The largest outbreaks of dysentery during the week were in Cornwall (Bodmin M.B. 9), Staffordshire (Lichfield R.D. 9), Lancashire (Blackburn R.D. 8).

The notifications of infectious diseases in Scotland also showed a decline, although there were 18 cases of diphtheria in excess of the preceding week. The largest decline was in respect of dysentery, notifications of which fell from 95 to 51.

Paratyphoid and Typhoid Fevers

A further decline was recorded in the incidence of these diseases in England and Wales during the week. Local centres of infection, which have been a feature of the returns during recent months, are tending to disappear, and the total is now formed of isolated and widely distributed cases. The 35 cases of paratyphoid were in fifteen counties, the largest returns being those of Warwickshire 7 and Hertfordshire 6. The 20 cases of typhoid were contributed by sixteen counties.

Cerebrospinal Fever

An increase of 14 cases over the preceding week was recorded in England and Wales. Almost half the notifications occurred in four counties—namely, Durham 9, Lancashire 17, Warwickshire 8, and Yorkshire, West Riding, 8.

The incidence of this disease has shown, of all the infectious diseases, the greatest increase during the war. The following table makes a comparison of the trend, in four-week periods, between this year, 1940, and the immediate pre-war years :

Week	No. of cases notified 1941	1940	Av. of 1937-9	Cases as a percentage of the average of 1937-9 1941	1940
1-4	1,092	488	137	797	356
5-8	1,483	1,847	140	1,059	1,319
9-12	1,437	2,237	146	984	1,532
13-16	1,256	1,749	131	959	1,335
17-20	1,110	1,401	120	925	1,167
21-24	992	1,001	98	1,012	1,021
25-28	777	830	91	854	912
29-32	604	603	75	805	804
33-36	463	470	64	723	734
37-40	439	471	64	686	735
41-44	403	535	70	576	764

The epidemic of 1940, which began in the first weeks of the year and reached a maximum of 617 cases in the ninth week, failed to subside to the pre-war endemic level ; as a result the notifications in the first weeks of this year were higher than in the preceding year. The rate of increase in the first weeks of this year was below that of last year, and despite the higher initial level the maximum weekly notification was only 430, occurring in the eighth week. During the weeks following the maximum the rate of decline was less this year than last. The fall in the number of cases from weeks 9-12 to weeks 29-32 was 73% in 1940 and 58% in 1941. The decline has persisted for a longer period this year than in 1940, when the trend during the last three of the four-weekly periods tabled was similar to the pre-war years, although at a considerably higher level.

Quarterly Return for England and Wales

The returns for the second quarter of 1941, published by the Registrar-General, show that the births and deaths have deviated much from the recent trends. A death rate of 13.5 per thousand was recorded, compared with 11.6 for the second quarter of 1940 and 11.7 for the average of the five years before 1940. The birth rate was 14.2 per thousand, compared with 16.2 in the second quarter of 1940 and 15.8 of the five preceding years. Infant mortality was 59 per 1,000 live births, 6 above the average of the ten preceding second quarters. Stillbirths formed 3.6% of all births. The natural increase (excess of births over deaths) was only 7,355, as compared with 46,980, 43,777, and 44,991 for second quarters of the three years 1940-38.

Returns for the Week Ending November 8

Notifications of infectious diseases during the week in England and Wales included scarlet fever 1,366, whooping-cough 2,029, diphtheria 1,069, measles 747, cerebrospinal fever 113, poliomyelitis 33, dysentery 148, paratyphoid 31, typhoid 12. Twenty deaths were due to influenza.

Medical News

Group Captain C. P. Symonds will deliver a lecture on "Meningitis" at the Weston Hotel, Bath, on Thursday, November 27, at 5.30 p.m. All Service medical officers and civilian practitioners will be welcome.

The meeting of the Section of Neurology of the Royal Society of Medicine, which was to have taken place at Chase Farm Hospital, Enfield, on November 15, will be held on Saturday, November 22, instead.

The next quarterly meeting of the Royal Medico-Psychological Association will be held at 11, Chandos Street, W., on Wednesday, November 26, at 2.15 p.m., under the presidency of Dr. Thomas C. Graves, F.R.C.S. Dr. E. L. Hutton will read a paper on "The Investigation of Personality in Patients treated by Prefrontal Leucotomy."

A meeting of the Medico-Legal Society will be held at 26, Portland Place, W., on Thursday, November 27, at 4 p.m., when Dr. H. Neville Stafford (coroner, County of London, Western District) will read a paper on "The Coroner and Civilian War Deaths."

The annual meeting of the Medical Benevolent Society for the East and North Ridings of Yorkshire was held recently in the rooms of the York Medical Society, Stonegate, York. After routine business was completed the following officers were elected for the ensuing year: President, Dr. Thornley of Beverley; President-Elect, Dr. M. Jacobs of Hull; Vice-President, Dr. Longbotham of Middlesbrough; Honorary Treasurer, Dr. Mackay of Hull; Honorary Secretary, Dr. Kelly of York. An application for aid was received on behalf of a disabled member, and it was decided to make a grant towards the education expenses of his son, who will be selected in April, 1942, for a university course. It was also decided to invest the credit balance for the past year in 3% Defence Bonds.

On November 13 at Liverpool Assizes Mr. Justice Croom-Johnson passed sentence of four years' penal servitude on John Knox Thompson, M.B., B.S., R.U.I., of Princes Road, Liverpool, and ordered him to pay the costs of the prosecution. Dr. Thompson, who is 61 years of age, had been found guilty on ten counts under Defence Regulations of having issued untrue medical certificates to members of H.M. Forces, and on a further count of having attempted to obtain £1 14s. 6d. from the War Department by false pretences. The judge, in his stern comment when passing sentence, said he had thought carefully over the case to see whether he could find the smallest excuse or extenuating circumstance for what the accused had done, but he found none; Dr. Thompson had brought scandal and disgrace on a noble profession.

The Medical Research Council has decided to print the monthly bulletins of the Emergency Public Health Laboratory Service, so that copies may be distributed more widely than has hitherto been practicable. The first to be printed is the November issue, and deals, among other matters, with paratyphoid in the Liverpool area, an outbreak of food-poisoning in Oxford, and a further one in Romford.

In a circular (2517) issued by the Ministry of Health on November 14, attention is directed to a new regulation, relating to scabies, which has been added by Order in Council to the Defence (General) Regulations, 1939. The regulation enables the Minister to make an Order providing for the inspection of premises in which verminous persons are or have been accommodated, for the examination and treatment of any other verminous person in such premises, and for any necessary cleansing or destruction of articles on such premises—all this if the Minister is satisfied that "scabies or any other disease associated with verminous conditions is so prevalent as to prejudice the efficient prosecution of the war, or the maintenance of supplies and services essential to the life of the community." The Scabies Order has now been made, and powers are given to local authorities to take the necessary steps to bring under control this widespread infestation of the public.

On November 12 Dr. Astley V. Clarke was nominated as a sheriff for the County of Rutland.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.
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B.M.A. SCOTTISH OFFICE: 7, Drumsheugh Gardens, Edinburgh.

QUERIES AND ANSWERS

Intermittent Polyuria

Dr. G. BAYNTON FORGE (Salisbury) writes in reply to G. A. G. S. (April 26, p. 658): In similar cases I have obtained excellent results from euflavine (neutral acriflavine) in 1/2-grain doses t.d.s. Very often two tablets will secure the desired result in one day. The condition seems to be due to an increase in the number of colon bacilli, and the acriflavine acts promptly. I usually get 100 tablets, 1/2 grain, enteric-coated, from British Drug Houses.

LETTERS, NOTES, ETC.

Blood Grouping in the Forces

Dr. W. LEES TEMPLETON (Highgate, N.6) writes: In a recently published book, *Under the Iron Heel*, by an American who lived in Belgium up to 1940, the author comments on the thoroughness of the German preparations, and mentions as one example the fact that on each soldier's identity tag is placed, in addition to the usual name and number, his blood group, so that even on the field it is possible for any man, even a high staff officer, to be stopped and, if it is required, to be compelled if of a suitable group to give his blood. It may be, of course, that similar precautions are taken in our own Army, but it would seem that it is something worth copying not only in the Forces but among the civilian population. That it would entail a lot of work is undoubted, but one feels that it could be undertaken—for example, by members of the E.M.S. staffs standing by during quiet periods.

Anti-tobacco Campaign in Germany

An article by Prof. Hans Reiter, president of the Reich Health Office, on the evils of tobacco-smoking appears in the *Reichs-Gesundheitsblatt* of July 2, 1941. The article is based on the investigations into the dangers of tobacco undertaken at a meeting in Weimar last spring, where it was stated that it was the right and duty of the State and party to combat the evil of tobacco-smoking by every possible means. The individual is asked to make sacrifices for the community. Formerly the "property condition" of a State was the standard of its wealth. Under the Führer the wealth of a country consists in its biological possibilities of development, and the condition of a nation's health is the measure of its cultural and material value. An intensive campaign of organized propaganda against the consumption of tobacco, financed by the State, is to be undertaken in the Press, theatres, cinemas, and all places of public assembly.

Treatment of Scabies

Dr. E. DRYBROUGH-SMITH (Sutton Coldfield) writes: The following is a simple and effectual way of treating scabies in the home. The patient is directed to sponge the body with warm water and soap (a tub of hot water is all that is required); the skin is then rapidly rubbed over with a towel, and before it is thoroughly dry it is sprinkled over with flowers of sulphur (sublimed sulphur), avoiding the eyes. Some of the sulphur is also sprinkled between the bed sheets. In the case of adults this is performed on three consecutive nights, in the case of children on two in order to avoid sulphur rash. On the day following the completion of treatment the patient should put on clean underclothes and clean sheets should be put on the bed; no more sulphur should be used. As regards infected clothes and bedding, I understand that in most large towns the health departments will collect these, sterilize them, and return them on the same day, free of cost. Where that service is not available linen and cotton underwear and bedding should be boiled, and flannels and blankets should be steeped in a solution of lysol in water of a correct strength and then hung out in the open to dry. The advantages of this method are: it is quickly undertaken and the patient easily understands it; messy ointments are avoided and valuable fats are saved; it is cheap (clinics and hospitals should welcome that); it is easily carried out in the country cottage or in the town-worker's home.